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BULLETIN OF THE

TAYLOR SOCIETY

A SOCIETY TO PROMOTE THE SCIENCE AND THE
ART OF ADMINISTRATION AND OF MANAGEMENT

Scientific Management
During Times of Depression

Production Costs and Selling Price

Combination Routing

Classification and Standardization of Work
As a Basis for Day and Incentive Wage Rates

Rating Salaried Employees

Hospital Administration

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COMMENT

IN a discussion printed in an earlier issue of the BULLETIN,[1] a member of the Society called attention to an important fact: that the origin of scientific management coincided approximately with the end of the thirty-year period of falling prices and relative industrial inactivity following the Civil War, and that its development and utilization coincided with the twenty-five year period of increasing business activity which culminated in the intense activity following the World War. And he made the inquiry, What of scientific management during a depression—on a falling market?

EVIDENCE with which to answer the question is gradually becoming available. In the April issue,[1] Mr. Henry P. Kendall, who could testify from experience with several scientific management plants, said: "But I can bear witness tonight, from actual experience, that without scientific management we would not have been able so securely to meet the decline in prices and in business which we have had to meet during the past year; that without the greater knowledge and greater control which scientific management has given, we would not have been able, in the concerns in which I am interested, to get production down to match demand, to reduce business to fifty-five and sixty-five per cent of normal, and still make both ends meet. It has interested me to observe the greater precision with which scientific management has enabled us to meet the situation; for instance, to see the ratio of sales to inventory change from 2 to 1 a few years ago to 4.5 to 1 after the Armistice, and then when greater pressure came on, to 7.5 to 1, a thing which we would have thought impossible a few years ago."

A BRIEF but significant article in this issue[2] brings similar testimony from Mr. Richard A. Feiss: "During these times of industrial depression and stress such as the world has never seen, the organizations whose management can be called truly scientific have come through, and are prepared as are no other organizations in their respective industries for the better times to come." And Mr. Wilfred Lewis, in discussion at the December meeting,[3] made the following observation: "In the last two years we have been through a fire, a moving, and an unprecedented boom followed by an unprecedented depression, and we still have our system intact. . . . Where there is comparatively nothing to do, as at the present, the problem of maintaining an organization and with it an elaborate system of production is very trying indeed, but we figure that eventually *it would cost more to shut down and rebuild our organization.*" And we know other concerns, which shall not be named because they have not put themselves on record, that could give similar evidence; one concern which has performed the remarkable manœuvre of cutting its force down to nearly a quarter in changing from abnormal specialized war production to normal peace production, and has at the same time greatly enlarged its line of products; another which let scientific management lapse during the boom, when cost was not a problem, and inaugurated restoration as rapidly as possible at the beginning of the depression; others whose production has been greatly curtailed by style influences, but have held firm because having all factors of production under precise control. As we have said elsewhere:[1] "If it yields results on a market of rising prices and active business, it is also a great aid in the readjustment to new condition on a market of falling prices and decline in business. It gives control and power on the up-grade, and control and steadiness on the down grade."

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[1] Vol. VI, No. 6, p. 234.

[1] Vol. VII, No. 3, p. 43.

[2] Pp. 126-128.

[3] Vol. VI, No. 6, p. 231.

BUT all of this testimony is from concerns which had scientific management well developed and established before the depression—even before the war. They had had enough experience with its precise control during an active market to know what a power for safety that control would be on a falling market. So their knowledge and imagination inspired them to preserve it at a time when most concerns were yielding to the pressure to cut overhead ruthlessly. And they have enjoyed the benefit. But not a few concerns which had begun the development of scientific management during the war, and did not much mind the investment cost during a period of active business and high profits, *did mind the cost* and discontinued the development as soon as the depression set in. Their experience had been with investment cost only, and not with the major returns from the investment. They had not yet acquired the confidence which comes to firms which have got past the investment stage of development. Therefore much development work has been discontinued during the past two years. The profession of management engineering has suffered a decline and is at the lowest point in its history because this is the first depression it has had to face since it became a profession. And this relative inactivity in the profession will probably continue for some time, for in the first place resumption of industrial activity will be gradual, and in the second place as activity is resumed firms will not call in outside professional assistance until increase in production has absorbed the energies of the staffs which they have carried through the depression. But then will come a new demand upon the management engineer, for the outstanding feature of the new business activity will undoubtedly be a most intense competition—in selling, therefore in prices quoted, and finally therefore in economy of production and selling.

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[1] Vol. VII, No. 2, p. 38.

SCIENTIFIC MANAGEMENT DURING TIMES OF DEPRESSION[1]

By Richard A. Feiss[2]

THE purpose of a plant organization is production. All production organizations are built for capacity production; therefore curtailment of production due to general business depression is not a true test of the worth of any organization methods devised for production. In comparing one type of management with another, however, times of stress furnish a good test for certain purposes.

2. In comparing scientific management with the ordinary type of management during times of depression we shall first take into consideration the counts against scientific management. For practical purposes all counts can be summed up under one head; a large amount of administrative machinery and consequently a large amount of indirect expense that exists under scientific management as compared with ordinary types of management. We must admit that this difference is a real one. Nevertheless, it is to some extent more apparent than real. Scientific management separates and classifies expenditures of all sorts, charging to the direct expense only the purely "direct labor" charges. Under scientific management with its precise classification of expenses, there are a great many expenses classified as indirect which are universally called direct under the ordinary type of management. This, however, only accounts for some of the difference. Admitting this difference, our contention is that it does not constitute a count against scientific management.

3. The belief that a large percentage of indirect expense constitutes an organization or business evil is a relic of the time when business men thought only in terms of the antiquated accountant and his antiquated methods. This belief involves a fallacy. It is an attempt to compare two things that are not comparable. As a matter of fact the proportion of indirect to direct expense means by itself nothing. It is true that there is a relation, but let us see what that relation is or what it proves, if it proves anything.

4. Glance for a moment at the following:

Example	*A*	*B*	*C*	*D*	*E*
Indirect Expense	20	25	25	25	30
Direct Expense	50	50	35	30	20
Total Expense......	70	75	60	50	50

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[1] Address delivered before the Chicago Section of the Taylor Society, Thursday, April 20, 1922.

[2] Joseph & Feiss Company, Cleveland, Ohio, President of the Taylor Society.

5. Let "A" represent the relation of indirect, direct and total expense in any organization running under good type of ordinary management. Now it is true, if the indirect expense increases without any reduction in the direct expense per unit, as in example "B," that comparison with previous condition "A" would call for investigation. This, however, is not the case under scientific management after it is once developed, although during the development period such condition might well exist. Under scientific or any form of management where progress is being made, conditions are very likely to change until we find existing such situations as are illustrated in "C," "D" and "E."

6. The primary object of scientific management or any management is to improve operating conditions and to obtain greater efficiency from the production processes. This is done only by the installation of better methods of management or by inventions or improvements or other short cuts in operation. This as a rule does not cut down the expense of supervision, clerical work or other indirect activities. In fact it is generally necessary not only to improve the work of the executive and other employees on the indirect payroll, but even in some instances to add to this force in order to acquire and maintain the efficiency sought from the operatives on the direct payroll. Here we come to the first fact; that the most significant measure of efficiency is a decrease in the direct expense apportioned to the product.

7. One can readily see that a comparison of present direct expense with anything but previous direct expense does not in itself mean anything. Take for example case "D," where the indirect expense is maintained at its normal level and the direct expense is very materially cut down by increased efficiency. While there is a substantially lower expense of the entire product as compared with the case in example "A," nevertheless, the proportion of indirect to direct has very materially increased, and so it will be in any example where the efficiency of any production organization is materially enhanced. This can be done only by decreasing the direct expense chargeable to the product and the consequent increase in the percentage of indirect expense. Consequently, if the proportion of direct expense to indirect expense means anything it can be stated as follows: *That an increase in the proportion of indirect expense to direct expense is a proof of better management and greater efficiency, provided the total expense chargeable to the product does not increase.*

8. There exist in most businesses besides the indirect payroll, other indirect expenses amounting to a large proportion of the general indirect expense. These consist of such items as carrying charges, maintenance, supplies, and so on. These are proportionately smaller and under better control in the case of scientific management than in the case of ordinary management. Because of better control there exists the possibility of cutting them down, when necessary, more readily and intelligently. Again, by reason of better control and more scientific organization, fewer economies need be made in times of depression, inasmuch as economies generally looked for during such times under ordinary type of management are continuously being made under scientific management, and the benefit therefrom accrues during normal times as well as during times of stress.

9. In replying to the counts against scientific management we have already touched upon many of the points that could be called counts in favor of scientific management. There are many more of these, of which only a few need be mentioned. When it is necessary to curtail production during times of depression, the analytical methods used under scientific management for the determination of wages automatically permit curtailment of such expense with greater precision and safety than under ordinary management. At the same time those executives and methods necessary to maintain utmost efficiency and to permit a just and substantial wage return to employees during normal times are continued during times of depression. For the same reason and because of better organization, the morale of the force is better maintained. Moreover, because of better control and output and costs together with the ability to give a better and cheaper service, the necessity for the curtailment of time is less likely to occur.

10. By reason of the more detailed as well as comprehensive knowledge that scientific management gives to those whose business it is to plan and direct, it is possible to look ahead and appraise and plan for the many contingencies that arise not only during times of depression but at all times. It is for this very purpose that much of the administrative machinery is set up, and therefore a substantial portion of the indirect expense is just as necessary in times of depression as in normal times. As a result of this better control and planning ability a scientifically managed organization is better able to adapt itself to conditions and to make such economies and plans as are advisable for the main-

tenance of the business. When conditions are such that it becomes impracticable to maintain any part of the indirect organization intact, it can be reduced as under any other type of management, and the effects of the reduction more accurately estimated. Under scientific management this reduction, if found necessary, can be made more intelligently and more fairly to those affected.

11. A reduction in the indirect force, however, should be considered only as a last resort. Before dispensing with the services of any of the more valuable members of the indirect force one must take into consideration the following:

a. The necessity of better planning to overcome the resistance to business;

b. The necessity for leadership and more intensive supervision in order to avoid unnecessary losses in operating;

c. The ability when times pick up of being able to take advantage of the pick-up against keen competition;

d. The possibility of a permanent impairment of investment in the loss of trained personnel of the organization;

e. The possibility of the loss of that other most valuable asset—morale.

12. In conclusion, one need take only the history of the organizations which are run under true scientific management as compared with those run under other types of management in order to find the answer. During these times of industrial depression and stress such as the world has never seen, the organizations whose management can be called truly scientific have come through, and are prepared as are no other organizations in their respective industries for the better times to come. In fact it can be pointed out that these organizations have contributed materially to the mitigation of the stress of the times and to the early restoration of normal business.

13. The large proportion of administrative or indirect expense to direct expense as commonly viewed, therefore, is no criterion of either economy in costs or efficiency in organization. At least eighty per cent of the time we have normal or good times. And management must build with the primary object of doing business effectively at such times. Good management, however, must look ahead and should be prepared for all contingencies. It should make plans for financial reserves to be used during times of depression and should conserve its resources in every other way. This should be done primarily by the building up of business on a basis of service. Business run with a view to service must at all times be based on economies in organization and economies in operation in order to render real service. This is the best preventive of the cutting of wages and the laying off of employees which is so universally practiced during times of depression and results in nothing of constructive value; on the contrary it produces bitterness. The efficiency needed for the maintenance of business as a service is the object of scientific management. Scientific management at all times organizes for the best possible service based on the elimination of both waste in human effort and waste in other forms, and for the proper control of all elements in industry making for the best efficiency and a fair return to all concerned at all times.

PRODUCTION COSTS AND SELLING PRICE DURING A DEPRESSION[1]

By Wallace Clark[2]

THE duties and responsibility of the man in general control of a business have been so well covered by recent addresses before the Taylor Society that there is little more to be said. I merely want to bring up one thing which is on the general manager's mind at present. He is not asking, "How can we increase our profits?" but he is asking, "How can we reduce our losses?"

If the industrial engineer is to be of any help in the general control of a business, he must be able to answer the latter question.

In a period of declining or dull business, there are in every manufacturing plant certain expenditures which must go on no matter how few orders there are. The only way to avoid these expenditures is to sell out and in these days that means giving the plant away. If the business is not sold out, it is obvious that the buildings and equipment of every kind must be kept in such condition that they will not deteriorate. If any work at all is to be done, a skeleton organization must be kept in the shop—the superintendent, foremen, inspectors, truckmen, watchmen and so on. The manager usually tries every other way out before he gives up the nucleus of his working force because he knows it will be easier to erect new buildings and buy new machines than to rebuild his organization.

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[1] A discussion at a meeting of the Taylor Society, New York, December 3, 1921.

[2] Consulting Engineer, New York.

For the sake of simplicity, let us take a one-product plant such as a foundry or, better still, a drop forge shop which makes forgings for other companies. The manager has ceased to buy any steel except what is required for actual orders in hand. If he has had sufficient money or credit, he has made the repairs or improvements to his hammers, furnaces and buildings, a maintenance he had not had time to take care of when the shop was full of work. Let us suppose that all this has been done, that he is down to his skeleton organization, and that he has not even enough orders in his plant to keep these men busy. He is losing a good deal of money each month. What is his next step? How is he going to reduce his losses?

The manager has, of course, attempted all along to keep up his sales. He has been unusually careful of the quality of his forgings, has met all delivery promises, has increased his advertising and sent out more salesmen. The only remaining way to increase sales is by a considerable reduction in price. It is natural for him to shrink from this course, and before he takes it he wants to know how far he can reduce prices without increasing his losses.

There are certain expenses which must go on if the shop is kept ready for work: the interest on the investment in land, buildings and equipment, depreciation, taxes, insurance, repairs and the salaries of his skeleton organization. The shop must be provided with light, heat, water and compressed air. All these expenses go on whether there is work or not; they are due to keeping the shop ready for work and are not increased or decreased by the acceptance of an order. It is therefore clear that these overhead expenses or losses will not be increased by the acceptance of an order at a price which does not cover any of his overhead.

However, the acceptance of an order for forgings will cause certain other expenses. Steel must be bought or drawn from stores; one or more hammer men must be hired; power must be used for the hammers, although this additional expense for power will be small, for insurance regulations usually require that steam be kept up for the operation of fire protection apparatus. Fuel must also be used in the forges. These expenses are caused by the acceptance of any specific order and the price must, therefore, cover such expenses—that is, the cost of material, direct labor, some power for the hammers and fuel for the furnaces—for if the price does not cover those out-of-pocket expenses, the acceptance of that order will increase the losses.

Going back to the question "How far can prices be reduced without increasing losses?" the answer is: *"To a point which covers the cost of material, direct labor, power and fuel, but which does not cover any part of the overhead."*

In other words, it is possible to sell below cost without increasing losses. When I speak of selling at this material-labor-power-fuel cost without loss of money, I do not mean to say that that is the real *cost* of the forgings, for it is not. A portion of the overhead of the department and plant has been used in the production of the forgings and must, therefore, be charged into their cost. However, we are talking of reducing losses rather than making profits, which of course, must be based on costs.

Since we have found how low prices can be quoted without increasing losses, the next question is, "What prices should be quoted to reduce losses?"

Knowing that he has nothing to lose until he reaches the material-labor-power-fuel cost, the manager begins to lower his quotations and keeps on until he gets the orders. It is not likely that he will have to go as low as the point mentioned. When he does reach the level at which he can secure orders, how long should he continue to quote those prices?

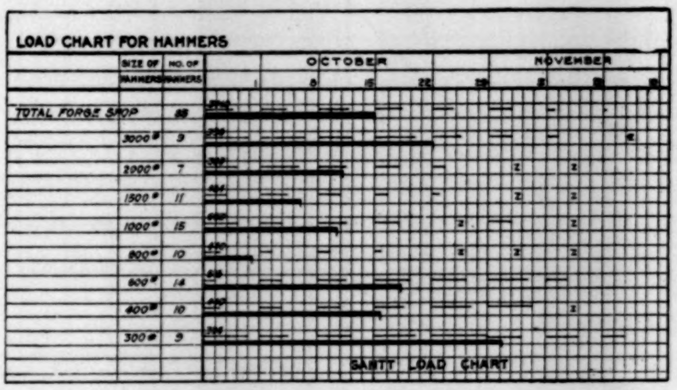

Figure 1

To make this clear, let me tell you how we worked it out in one drop forging plant.

The reason for quoting low prices was the small amount of work in the plant, and it was evident that the prices should fluctuate as the work ahead fluctuated (Figure 1). This is a Gantt Layout Chart on which the work ahead of the hammers was shown. Looking at the second line of the chart, there were nine 3000 lb. hammers in the shop and in a 44 hour week their capacity was 396 hours. They had work assigned to them which would keep them busy 80 per cent of the time as shown by the light line. It was the same the second week; but for the week ending November 12, only 20 per cent of their capacity was taken up. The heavy line showed that the total work ahead of the 3000 lb. hammers would keep them busy for four weeks if it could have been spread over them evenly. The 800 lb. hammers, however, had less than one week's work ahead.

The first line of the chart showed the total work ahead of the forge shop. In the first week 50 per cent of the time was taken up, which gradually decreased until there was only 10 per cent in the week of November 19.

This chart was made out at the beginning of each week and showed the work ahead of the plant at that time.

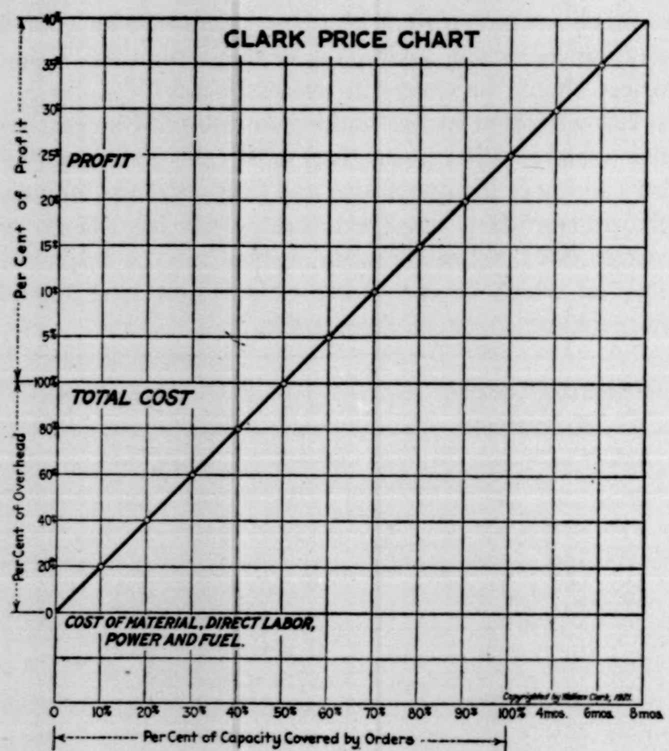

Figure 2

The lower part of Figure 2 shows the cost of material, direct labor, power and fuel. The next line is "Total Cost" and above that is "Profit." Across the bottom of the chart is the percentage of capacity covered by orders. By experiment it was found that if the Load Chart showed 10 per cent of the capacity taken up with orders, prices should be quoted which covered the cost of material, direct labor, power and fuel and only 20 per cent of the overhead. When 30 per cent of the capacity was taken up, the prices to be quoted should include 60 per cent of the overhead. With 50 per cent capacity, the prices covered all the overhead—that is, the total cost. Profits began when the shop was more than half full of work, and at 60 per cent of capacity 5 per cent of profit was quoted. When 100 per cent of capacity was taken up, 25 per cent profit was quoted. When delivery was not wanted for six months or the work ahead prevented the promising of delivery in less than six months, there was greater danger of increases in cost of material and labor and, therefore, 35 per cent profit was quoted.

These two charts were put in the hands of the man who quoted prices and he used them as a guide. This price chart was made for a specific plant and would be different for any other plant. The price line would be either more or less perpendicular than this line. This is an example of working out the Gantt theory of the cost of idleness and applying that theory to the quoting of prices.

An industrial engineer usually finds a manufacturer interested when he discusses raising prices or maintaining prices, but when he begins to talk of reducing prices, the manufacturer's interest suddenly flags and he excuses himself to keep another appointment. It is not the job of the industrial engineer to give the manufacturer advice as to the prices he should charge. The manufacturer is in his position of authority because he has specialized in marketing and financing, and he should know the prices at which he can find a market for his product. What the engineer can tell him is what effect the prices to be quoted will have on the manufacturing plant and what effect the manufacturing plant should have on prices.

When there is plenty of work ahead, prices should be quoted which will produce profits, but when there is little work to be had, prices should be quoted which will reduce losses. Losses must be eliminated before there can be any profits.

MANAGEMENT WEEK

October 16-21

A week of joint meetings of local sections of the A. S. M. E., the S. I. E. and the Taylor Society.

COMBINATION ROUTING[1]

TO MEET THE PROBLEM OF SMALL QUANTITIES AND SHORT OPERATIONS

By D. J. Walsh, Jr.[2]

THE type of routing which I shall endeavor to describe is a development of a style of routing with which I assume most of you are familiar, or of which you are at least cognizant. For the benefit, however, of those who may not be familiar with it, I shall try to define it as briefly as possible.

By the term "routing" I mean such analysis and arrangement of the work to be done as will conduce to the effective control and orderly progress of the work in the plant. In its limited sense it is descriptive of the work done by the "Route Clerk," as set forth in Mr. Taylor's "Shop Management." I trust you will forgive me and not be confused, if I seem occasionally to use the word in a more inclusive sense, covering both the analysis or planning of the work as done by the Route Clerk and the control of the actual progress of the work, which is chiefly in the hands of the functionary designated in Mr. Taylor's book as the Shop Order of Work Clerk.

The routing methods described in "Shop Management" are much further developed than those found in most shops, and are worthy of the closest study. The principle involved is that the management of an enterprise should know in exact detail what work is to be done, and should plan carefully to secure the accomplishment of the necessary work. The methods and mechanisms used to realize the aim set forth in this principle differ widely in common practice, even though there may be substantial agreement as to the principle. Certain well-tried methods and mechanisms are described in "Shop Management," and have more recently been described in somewhat more extended form in a series of articles by Mr. H. K. Hathaway which appeared in *Industrial Management* during 1920.

Both the basic principle and the chief mechanisms employed in the routing with which this paper deals are strictly in accord with those indicated by Mr. Taylor and Mr. Hathaway. It is only an interesting application of these basic principles and mechanisms that has given rise to this paper.

The sub-title of this paper says, "to meet the problem of small quantities and short operations." To the best of my limited knowledge most shops have this problem, although perhaps more marked in shops making a variety of products and using what we may call a non-continuous routing. In such shops the production is likely to be composed of fairly well-defined lots or batches of restricted size. These lots or batches are worked on intermittently at successive operations, and usually maintain their separate identity until completion or final entry into an assembly.

The nature of the successive operations is usually such that some require very little time to perform and some require a rather long time to perform. Consequently, a batch which is the maximum practicable size for a certain operation may prove to be annoyingly small for the next operation. Likewise, in the manufacture of components for an assembly the quantity of any individual component required may be so small physically, and so insignificant from the point of view of work to be performed at any single operation, as to make it at least a nuisance in the shop. Where the number of these components is large, or, in the case of a concern with an extremely varied sales line, where there are numerous sales items sold in small quantity, a real problem presents itself in connection with the necessity of effecting their orderly progress through the shop.

It is easy enough, perhaps, to start numerous small jobs on their way through the plant, but it is a great deal more difficult to keep them moving along properly than is the case with larger jobs. This is particularly true in shops which depend for control of work in progress on "chasers" or the natural pull of urgent requirements for assembly or shipment. In that sort of shop, small jobs have a tendency to get side-tracked, forgotten, lose their identity, accumulate ahead of machines, tie up tote-boxes, trucks, and other equipment, use up valuable working room, finally become "urgent," and generally contribute to confusion and delay. All this is due to their very nature of smallness. Incidentally, these small jobs are despised by piece-workers, who deliberately shove them aside as long as other and larger jobs offer.

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[1] A paper presented at a meeting of the Taylor Society, New York, Dec. 3, 1921.

[2] Sanderson & Porter, New York.

The shop control mechanisms described by Mr. Taylor are designed to obviate most of these difficulties, and in effect provide the means for establishing and insuring a definite priority and an assured progress of jobs through the plant. None the less, small quantities and short operations are a burden to the life of the Shop Order of Work Clerk, and are a handicap to the efficient and economical use of shop facilities. Where such small jobs amount to a considerable proportion of the total jobs, the efficacy of the whole mechanism of shop control is threatened, and it sometimes seems almost hopeless to endeavor to regulate the shop from the Planning Department bulletin board. The well-known situation in which the Bulletin Board becomes the tail to the dog, or perhaps reaches the dignity of an overworked and outdistanced Recording Angel, quite often has its origin in a glut of small jobs. In this situation the Planning Department and particularly the bulletin board crew, go through a highly complicated and expensive series of useless motions which earn for them only the pitying scorn of the shop.

Combination Routing is an attempt to counteract to the greatest practicable extent the handicap imposed by small quantities and short operations. It can not eliminate this handicap, but it modifies it to a degree that is a welcome relief. It is based on the feasibility of combining for short operations two or more batches that may properly be handled separately for longer operations. Likewise, it capitalizes the feasibility of routing in one batch a number of different products that call for essentially the same operating treatment, and are of the same degree of urgency. A useful feature of this sort of combination is the convenience of routing through the shop together, products intended partly for stock and partly for shipment. The manner in which the combinations are effected is very simple, and merely calls for the same degree of intelligent routing that is expected where combinations are not used.

Perhaps all this will seem less like an academic proposition if I get down to cases, and tell you some of the salient features of the development of combination routing in a specific plant. The plant I have in mind is that of Herrmann, Aukam & Co., Lebanon, Pa., manufacturers of plain and embroidered handkerchiefs. Early in 1914 the installation was begun of planning and control methods along the lines described in "Shop Management." Mr. Hathaway was in charge of the installation, and was accorded throughout the cordial support and cooperation of Mr. M. C. Herrmann, President, and the able assistance of Mr. Karl Herrmann, the present Works Manager.

The situation presented the small quantity and short operation problem, and it was evident from the beginning that combinations in some fashion were necessary. Under Mr. Hathaway's inspiration the present scheme of combination routing was devised, made effective absolutely as planned, and is working as smoothly as ever, today, seven and a half years later.

At the start, practically all work available for introduction into the shop was in quantity less than what was recognized as providing a desirable job at the principal operations. It was predetermined that our shop-control methods should be those described by Mr. Taylor and patterned in detail after those in operation at the time in the plant of the Tabor Manufacturing Company at Philadelphia. Slight modifications of the printed forms, such as the route sheet, operation orders, move orders, inspection orders, tags, and stores issues, were the only changes required in the physical appliances.

Time study and general observation determined desirable basic batch quantities for the principal operations for the different main varieties of product. Handling facilities were provided in accordance with these determinations, and these facilities in turn fixed the cardinal principle of the scheme of combination routing. This depended on the necessity of a fixed and permanent identity of each of the elements entering into a combination, just as is the case with a time element in an elementary time study. The first rule, then, was that an element of any combination must be indivisable, and must not exceed the basic batch quantity. It could be any fraction of a batch quantity, and preferably, should be exactly that quantity. Trucks and transportation devices were standardized and subdivided into units containing normally fixed quantities, and an effort was made in the routing to make elements (or items, as they were designated) of a combination, multiples of this normal fixed handling quantity. Time study, of course, was the agency that worked out all these details in consistent fashion.

The permanent identity of any element in a combination was assured by assigning to it an "item number" in the routing, which number appeared on the tag placed on the goods before leaving the storeroom. This designation appeared also, or rather in the first instance, upon the route sheet, where it was necessary in connection with the preparation of the various forms used. The route sheet was designed to show simply and graphically the arrangement of the items in different combinations for successive operations, this being done by the Route Clerk solely for the benefit of the tag writing clerks. Upon this sheet it was possible for the Route Clerk to indicate any desirable combination of items or batches.

There were naturally limitations upon the desirability of combination. For instance, it was normally the rule that there should not be routed on the same sheet, goods requiring different sequences of operation, goods of very different degrees of urgency for shipment, goods of such similar quality and appearance as might accidentally get mixed, and in certain cases, goods requiring different degrees of operating skill. These limitations, however formidable as they may sound, only very slightly restricted the field for combinations, and the vast majority of orders routed were of the combination character.

The second guiding rule for the Route Clerk was to make up full batches. The purpose of this was twofold—to use handling equipment to capacity, and to provide a job of decent length at each operation. The basic batch quantities determined for each operation, for each main class of product, were in the relation of multiples. For example, the batch quantity for the machine-ironing operation might be 150 doz., and the batch quantity for the folding operation either 300 or 450 doz., and for the ribboning operation 150, 300, 450, 600, or 900 doz., depending on the class of goods. Incidentally this arrangement simplified very much the Planning Department work in applying allowed times to the operation orders.

To provide the Route Clerk with the information necessary to enable her to work to the plan described above, involved a very considerable amount of analysis and classification of product with respect to quality, operating sequences, operating times (related to standard batch quantities) and similar information. The net result was the extreme simplification of the routing task.

When the Route Clerk had indicated the combinations to be made, the tags and forms required were prepared by reference to the route sheet, the allowed times entered by the Time Study Department, and the further destiny of the routing passed into the hands of the Shop Order of Work Clerk.

In contrast to the benefits inherent in the consolidation of innumerable small jobs into a reasonable number of larger ones, it might seem that a more than compensatory burden was imposed on the Order of Work Clerk. What I means by this is simply that with changing combinations to effect, the problem of bringing batches together for assembly may seem to be intensified. For example, if the routing specified four batches at the hand-ironing operation to be combined into one operation at the next succeeding operation of ribboning, the danger of allowing the completion of the four batches at the hand-ironing operation to be spread out over a considerable period, is obvious. If batch No. 1 were completed today, and the last of the four two days hence, the tie-up of goods and facilities would be intolerable. The function of the Order of Work Clerk is to prevent just this sort of situation, and we found that the added necessity of performing this function properly was a good thing, both for the Order of Work Clerk and the Production Clerk, who was kept more closely in touch with the hourly activities of his most important assistant. The avoidance of a flood of petty transactions at the Planning Department bulletin board eliminated confusion and harassing demands on the Order of Work Clerk's time. He was enabled to inspect properly the condition of the bulletin board, to make proper provision for work ahead, and, most important of all, to check frequently, regularly and carefully, the condition of the route sheets in the current file. Means were provided whereby those combinations most likely to be delayed could be easily checked by the Production Clerk or the Works Manager, and it was thus easy to develop in the Order of Work Clerk the habit of keeping on his toes. The exigency bred the remedy.

In the early days of the installation a further check of the Order of Work Clerk's activities was made by means of the regular taking of lists of jobs at the various stations in the shop. These lists were compared with the bulletin board and route sheets, and any wrong conditions brought to the attention of the Order of Work Clerk. Failure on his part to keep combinations moving would also inevitably and quickly tie up handling equipment, and bring complaints from movemen and gang-bosses in the shop.

The net result of all this was that dependence on combinations in the routing of the major part of the shop production was the means of forcing a high standard of performance on the part of the Order of Work Clerk; perhaps a higher standard than would be the case with straight routing, because under the combination scheme any shortcomings or neglect in the order-of-work fuunction were more quickly apparent and measurable. In large part, also, this is the answer to the objection that might be raised to combination routing; namely whether it would not result in an undue amount of work in process. The most common cause (outside of sales conditions, with which I am not dealing) of an excessive amount of work in process, is in non-existence of any order-of-work function worthy of the name. The routing I am describing demands and forces high efficiency in this function, and the spotlight that bears always on the Order of Work Clerk is comparable in intensity with, and a great deal more productive of useful results than, the "strong light that beats upon a throne." Moreover, as far as the amount of work ahead to be done is concerned, the rule followed of always having a second job assigned to each operator is not characteristic alone of combination routing, but was adopted as good, sound practice. Jobs averaged in length five to six hours, and orders required on the average a week to ten days to go through the works. There is no reason inherent in combination routing for the fear that by its very nature it is likely to clutter up the plant. It was devised and installed solely to secure a steadier and more orderly progress of work through the plant. It effected this purpose; and it is only uninterrupted progress of work that can keep down the work-in-process account.

To sum up as far as the order-of-work function is concerned: combination routing meant fewer jobs to watch; a much decreased number of transactions at the bulletin board, with the resultant elimination of commotion, confusion, and (incidentally) of clerks; less changing of jobs and time cards by operators; a corresponding decrease in the number of transactions handled by gang bosses, inspectors, and movemen; and a more peaceful, orderly administration all through the operating departments. The benefit accruing took all the curse off the old joke about being so busy running the system that you have no time to run the business.

I believe that to this method of routing, which provided jobs of respectable length, were also largely due the small measure of difficulty met in installing, and the highly satisfactory results secured from the task and bonus scheme used. Gang bosses, inspectors and instructors were not required to dash about madly from operator to operator, giving inadequate attention to each job. On the contrary they could and did give to their functions a systematic and well-ordered attention that produced the results expected and desired of them.

An interesting development of the routing was the control of storeroom operations from the bulletin board, in the same manner as all other operations in the shop. Failure to do this is a source of annoyance in the many shops where priority of issue of material is left entirely in the control of the Storekeeper. The Order of Work Clerk may as well control the issue or putting away of materials as any other work, and the storeroom personnel may as well be on the same task and bonus basis as the other work-people. In many shops the sole reason why this is not done is because it seems impracticable to handle systematically a very large number of petty transactions. In this situation, combination routing is most valuable.

Combination routing not only cuts down the number of different jobs in the shops and stores, and decreases storeroom transactions, but it also very appreciably diminishes planning room transactions such as balance sheet entries, payroll entries, production record entries, etc. It holds down the volume of current manufacturing orders and route sheets, and generally contributes to an economical consolidation of both records and effort.

I do not mean to imply that there were not difficulties about combination routing, but they were merely difficulties of installation. The operation of the method of routing I have been talking about, requires only the same unremitting, intelligent direction that good shop administration demands under any scheme. As a useful resource when confronted with the problem of small quantities and short operations, I suggest it for your consideration.

(Following its reading, Mr. Walsh illustrated his paper by lantern slides.)

DISCUSSION

CARL G. BARTH:[1] In his paper Mr. Walsh has given us one concrete example of how the simple fundamental principles for routing work and operations in an establishment must be specially worked out to suit local conditions. In so far he has presented a lesson that should be of great service to the inexperienced who may undertake to establish a routing system under similar or kindred conditions that do not permit of the simplest and most elementary form of routing.

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[1] Consulting Engineer, Philadelphia.

However, it appears likely that Mr. Walsh has paid no attention to the question of cost finding in connection with his combination routing, either because, at the time the same was instituted, cost finding was not attempted, or else because the cost-finding method in use was one of average-operation cost, or some other method different from cost finding by manufacturing lots of similar unit articles.

In nearly every machine shop we are up against the problem of cost finding in connection with numerous short individual cost orders implying similar operations on a single machine. This has been solved in a fully satisfactory manner through a kind of combination routing that has to be effected by the Order of Work Clerk independently of individual route sheets originally prepared, at a time when it would be impossible to foresee with which other short operations a particular short operation might eventually be performed.

Whenever a number of job cards representing short operations appear as work on hand for a particular machine, the Order of Work Clerk stamps these in succession (in the space ordinarily set aside for the time stamping), Job No. 1, Job No. 2, etc. on Summary of so many Jobs, and then clips them together with a so-called Summary Job Card, which is either a specially printed form or else merely a regular job card. This he stamps, Summary of so many Jobs Herewith, in the space ordinarily set aside for the charge of an individual operation job.

In the body of this Summary Job Card he then enters the sum of the prices recorded on the individual job cards, in the case of simple piece work; both the sum of the total high rates and the sum of the total low rates and of the task times, in the case of differential piece rates; the sum of the bonuses and of the task times in the case of task with bonus; and, finally, the total premium time, in the case of premium work.

In the settlement for the work where a time limit is implied, it is simply taken for granted that each individual operation has been done within its own time limit, if the total of the time limits recorded on the Summary Job Card has not been exceeded; and vice versa.

Different pay methods cannot be summarized in this way, but in the case of plain day work it can be done, though this necessitates the operator marking down on each individual job card the time he spends on the work it calls for, in a manner such that the total will substantially agree with the elapsed time eventually shown on his Summary Card.

The operator is given credit on the payroll by reference to the Summary Job Card alone, while this is of no interest to the cost department.

I have had instances of more than eighty very short operations having thus been combined by means of a Summary Job Card, with still the cost of each operation charged properly to its own cost order.

In connection with the building (they were not manufactured) of gun carriages at the Watertown Arsenal, we had excellent examples of combination routing of parts belonging to the same cost order. Several of the parts of a gun carriage had to be partially machined together with other parts, as it did not pay to make the large expensive jigs that would have been required to machine them independently of each other.

Each part had an independent route sheet, but this would at certain stages of partial machining show that the part had either to be moved to some other place to be machined together with one or more other parts, or how it at another stage perhaps had to await the partial completion of some other part, before a particular operation could be started.

In a certain other machine shop a machine to be routed had thirteen different, but in a general way similar, cams to be machined. The engineer of limited experience in daily charge under an occasional visit by me, at first had an independent route sheet made for each cam; a matter at once, and correctly, criticized by the plant superintendent, who said that when they had no system he just had all these cams put in one tote box and sent from one machine to the other, each operator performing his particular operation on the cams that needed it, leaving the others alone, until eventually all cams were finished. When the matter was called to my attention, I had no difficulty in showing how a single route sheet, i.e., combination route sheet, would do, on the system, just what they had done before the advent of the system.

Every shop and every industry has its own problems, and great ingenuity is always required in fitting the system to the particular needs of each place; and unfortunately, the professional engineer can rarely hope to stay long enough at a place to get it all accomplished.

CLASSIFICATION AND STANDARDIZATION OF WORK AS A BASIS FOR DAY AND INCENTIVE WAGE RATES

By Dwight V. Merrick[1]

IN any plan of wage payment, whether it is day wage or some incentive plan, it is essential to classify and standardize the various kinds of work, operations or occupations according to certain modifying factors such as the length of time to attain proficiency, the degree of physical strength necessary, the precision and closeness of attention required, the danger of injury, and so on. These different classifications take the form of an hourly rate valuation.

For a piece work plan, these hourly rate valuations serve as the Piece Work Base Rates, to which an incentive is added in order to determine the rate to be earned when the worker performs at the standard task time. These hourly rate valuations also serve as the basis for figuring the earnings, for plans where the pay is based on an hourly rate plus a bonus or incentive, such as the Halsey premium and the Gantt task and fixed bonus plans.

In making up this standard classification it is usual to start with the day rates for the various kinds of work already in effect, on the assumption that they represent the prevailing rates of the community. This method of arriving at the rates is not truly scientific, because of the lack of precise means for measuring elements of proficiency required, the degree of strength necessary, and other modifying factors. However, a fair test of the accuracy of the ratings is the relative ability to get and to hold a sufficient number of workers in the several kinds of work, and it is probable that such tests show up to a greater advantage where the incentive form of payment is operative. Arriving at a classification in this manner is nothing more than the application of the supply and demand principle, and this analysis and relative rating affords a quick approximation of the normal market relationship worked out through long experience and generally accepted.

In more or less indifferently managed concerns operating almost entirely by piece work or by some other rating plan, where the rates are based on past earnings or set by guess, usually no attempt is made to standardize and classify the *day rates*. Where such conditions prevail the day rates are apt to be too low in comparison to what can be earned on piece work, and often purposely so, in order to make it an inducement for workers to prefer piece work to day work. Quite often where there are such conditions, the possible piece work earnings are more nearly comparable to the prevailing day rates of the community, than to the day rates plus an incentive, when the maximum production is attained. The latter is of course to be preferred.

To standardize the day rates, in such cases it may be advisable to list the piece work earnings for different occupations and compare them with the prevailing day rates of the community, and from this work out a classification.

In the application of a piece work, task and bonus, premium or any other plan, an incentive is offered to induce the worker to expend his best efforts. These incentives may be classified under two heads: financial and non-financial. The first takes the form of increased earning over and above the prevailing wage when greater production is attained. The second, or non-financial, may take the form of a prospect of promotion, an expression of creative instinct, the desire to make, or some other human emotion. This latter type of incentive has not been developed to the same extent as the former in industry.

In the practical application of any of the financial incentive plans for the industrial worker, this should take the form of an additional earning, in excess of the worker's regular pay, and should be commensurate with the effort required for the accomplishment of the set task. In order to secure maximum output, it has been found that fairly definite percentages, depending on the character of the work, should be added to the regular rate of pay.

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[1] Consulting Engineer; author of "Time Study as a Basis for Rate Setting."

The late Frederick W. Taylor, in order to determine the amount of percentage to add as an incentive to the various kinds of work, made a series of tests somewhat along the following lines: First, time studies were taken and task times were computed for various kinds of work, from which rates were figured with various percentages of incentives, say from 8 to 20 per cent. These rates were given out to a large number of workers of more or less known qualifications, and the results noted. Where it appeared necessary to raise the percentage to make a greater inducement, it was done. The following recommendations resulted:

> The writer has found, for example, after making many mistakes above and below the proper mark, that to get the maximum output for ordinary shop work requiring neither especial brains, very close application, skill, nor extra hard work, such for instance, as the more ordinary kinds of routine machine shop work, it is necessary to pay about 30 per cent more than the average. For ordinary day labor requiring little brains or special skill, but calling for strength, severe bodily exertion, and fatigue, it is necessary to pay from 50 per cent to 60 per cent above the average. For work requiring especial skill or brains, coupled with close application, but without severe bodily exertion, such as the more difficult and delicate machinist's work, from 70 per cent to 80 per cent beyond the average. And for work requiring skill, brains, close application, strength, and severe bodily exertion, such, for instance, as that involved in operating a well run steam hammer doing miscellaneous work, from 80 per cent. to 100 per cent beyond the average.[1]

The general practice is to use a 25 to 35 per cent incentive; 25 per cent for the ordinary run of work is not sufficient. For convenience and simplicity, I like incentives that are multiples of three, and confine the classes to as few as possible; and I have succeeded in putting a large majority of work into two classes, namely, one-third and two-thirds of the regular wage, as an extra compensation. In some instances it has seemed desirable to increase the one-third incentive somewhat, and in these cases, I have used 50 per cent; again, for some work where the management was not disposed to allow the use of as much as one-third, I have used 25 per cent and in fact as low as 20 per cent.

For general purposes one-third and two-thirds incentives can be made to fill the requirements for nearly all of the work of a plant. The one-third incentive would be applied to the ordinary kinds of routine operations, requiring no particular mental concentration, close application, skill or hard work; then for the various degrees of compensation, regulate by a variation in the hourly base rate. The two-thirds incentive would apply to possibly certain classes of day labor and work entailing skill, mental concentration, close application and bodily exertion or discomfort. Here also the various degrees of compensation would be regulated by a variation in the hourly base rate.

The tabulation shown in Figure 1 illustrates a piece work base rate reference classification.[1]

CLASS	OPERATION	BASE RATE PER HOUR	TASK EARNINGS PER HOUR SHOULD BE
Drilling small parts			
A	Drilling, countersinking, counterboring, gage and sensitive drilling	$0.33	$0.44
B	Drilling clearance holes where working holes are drilled before machining and centering	0.30	0.40
C	Boring and countersinking	0.27	0.36
D	Boys' work	0.21	0.28
Drop forging			
A	Heavy parts (weighing approximately 15 pounds each) where skill is required to hold the part to size.	0.48	0.80
B	Light parts (weighing approximately 8 pounds each) where skill is required to hold parts to size	0.42	0.70
C	Heavy parts (weighing approximately 15 pounds each) where there is no necessity for close sizing	0.39	0.65
D	Light parts (weighing approximately 8 pounds each) where there is no necessity for close sizing	0.36	0.60
Power milling			
A	Split milling, octagon milling, and splining milling, where reliance is placed on the operator's skill to produce good work	0.30	0.40
B	Work where the piece is located by mechanical means, as pins, set-blocks, and the like	0.27	0.36
Hand milling			
A	Work where there are delicate cuts, or cuts requiring gaging	0.30	0.40
B	Clearance cuts only	0.24	0.32
C	Boys' work	0.18	0.24
Press work			
A	Work where the operator sets up his own dies	0.27	0.36
B	Work where the dies are set for the operator	0.24	0.32
Splining			
A	Work where reliance is placed upon the operator's skill to obtain proper gage fits	0.30	0.40
B	Work that is located by mechanical means, such as pins, set blocks, and the like	0.27	0.36

Figure 1

It will be noticed in the preceding tabulation that the inducement on the drilling, milling, splining, and press-work operations is 33⅓ per cent, while on the forging operations, where skill, physical strength and discomfort from heat and gases must be endured, the inducement is set at 66⅔ per cent.

The management exercises the same control of these base rates that it does of day rates. The time study department determines the task times and with the base rates, fixes the rate per unit. This process is parallel with the setting of the day rates which are necessary in day rate, premium and bonus plans. But it must be clearly understood that these base rates apply only to piece-work plans.

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[1] Taylor, "Shop Management," p. 26.

[1] Merrick, "Time Studies as a Basis for Rate Setting," p. 344.

For employing and promoting workers from one grade to another, it is necessary to show, in addition to the base rate classification, the minimum and maximum hourly rate for each occupation or operation, that is, a hiring or inexperienced workers' rate, and a rate paid experienced employees. In standardizing such a classification a start would be made with the lowest-paid, hourly rate of the plant, and this would be increased by a standard increment up to the maximum. The generally accepted increment varies between 10 and 15 per cent. For convenience in figuring it is advisable to have integral numbers, and with a variation from 10 to 15 per cent it is not difficult to work up a classification.

For example: starting with a minimum per hour of (cents) 15, 17, 19, 21, 24, 27, 30, 34, 38, 42, 47, 52, 57, 63, 69, 75, 84;

From such a wage classification, the experienced worker's rate for each occupation can be fixed to correspond to some figures in the classification. The minimum or hiring rate for this occupation could then start say two steps below, promotion being one step at a time. For example: If a rate for a certain occupation is determined to be 30 cents per hour for an experienced worker, then the hiring or inexperienced worker's rate would be 24 cents.

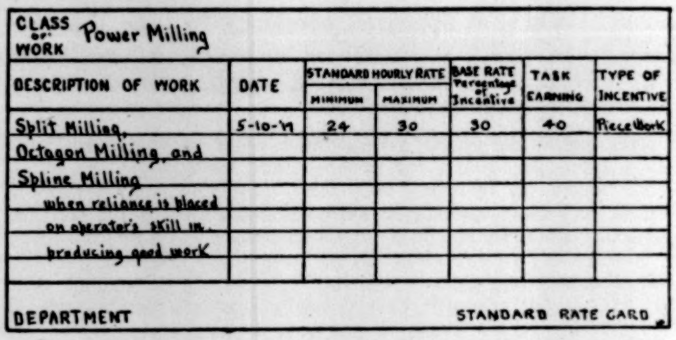
The piece work base rates for the different occupations should correspond to the maximum day rates for those occupations, but for convenience in figuring, where incentives of one-third or two-thirds are standards, it is desirable to have the task-earning a whole number, and in order that this may be accomplished the base rate should be divisible by three. To accomplish this a few of the base rates would have to be made to differ slightly from the standard day rates. For example (Fig. 2):

	CENTS PER HOUR																
Straight Day Rates	15	17	19	21	24	27	30	34	38	42	47	52	57	63	69	75	84
Corrected Piece Work Base Rates	15	17¼	19½	21	24	27	30	34½	39	43½	48	52½	57	63	69	75	84

Figure 2

If the hourly rate of a worker is below the base rate of his piece work job, he benefits; but if the hourly rate is more, then the difference should be paid in addition to the earning on piece work.

For the Gantt bonus plan, time of performance plus a percentage of the task, the earnings are usually figured on the worker's hourly rate plus the incentive; therefore, only the incentive percentage need be shown for the various occupations. For the Halsey premium plan, the incentive percentage would be shown as is done for the Gantt plan. The following form (Fig. 3) can be made to fill the requirements of all of the plans recommended:[1]



CLASS OF WORK Power Milling

DESCRIPTION OF WORK	DATE	STANDARD HOURLY RATE		BASE RATE Percentage of Incentive	TASK EARNING	TYPE OF INCENTIVE
		MINIMUM	MAXIMUM			
Split Milling,	5-10-'19	24	30	30	40	Piece Work
Octagon Milling, and						
Spline Milling						
when reliance is placed						
on operator's skill in						
producing good work						

DEPARTMENT STANDARD RATE CARD

Figure 3

In describing a wage rate classification, mention has been made of several different incentive rating plans, and it therefore seems fitting to say something about their application—when and where they may best be used. There are only four financial incentive plans that I should feel disposed to recommend for work that can be definitely assigned to a worker: first, the Taylor differential piece work; second, flat or single rate piece work, giving the performance time or the production per hour expected, third, the Gantt task and fixed bonus; and fourth, the Halsey premium plan. It is understood, of course, in the application of any one of these, that time study is the basis for the determination of the rate and that the management makes ample provision, with respect to all, for a thorough-going production control.

Of these, the Taylor differential is more exacting in its demands on both the management and the worker. This two rate system, a high rate per piece when the work is performed in task time or better, and a low rate when it falls below, of a necessity makes both the management and worker get together. For the worker will not willingly accept a lower rate per piece, if it is no fault of his that he is unable to perform in task time, while on the other hand the management, having to look into the conditions to find out the reason for a low rate, will, if the conditions are at all remediable, as they usually are, take steps to prevent such things happening again. The very fact that it is exacting is to its credit—for the reason that it has to be coupled with a high type of management. It has been demonstrated that it can be successfully operated to the satisfaction of the worker as well as of the management. One concern to my knowledge has had this system in operation fifteen years, and periodically the question comes up, whether the low rate feature should be discontinued; to date discontinuance has been over-ruled by the foremen each time. As a matter of fact in all these years the low rate paid has never amounted to 1 per cent of the total wage paid. This concern is the only one of which I know where this system is in operation in its true form.

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[1] This classification does not coincide with the base rates on page 137.

Very little is known about the Taylor differential piece work system, and probably for the reason that almost always when incentive systems are to be introduced, the introducers either want to work out their own ideas with the thought that a system can be made operative with little preparation, instead of first studying up the good existing systems, select one and then establish an adequate production control and scientific time study, and by so doing make a success of what otherwise might in time bring about dissatisfied workers. Therefore, when the Taylor system is suggested the usual criticism is that it is too exacting.

The flat or single rate system accompanied by the task time or the hourly production is an excellent plan. Such a system might require the performance of a task before the piece rate is paid, and in the event that the task is not accomplished, allow the day rate for the time taken; or pay per piece and depend on the worker's record of earnings to show management inefficiencies or the worker's standing as a piece worker, and whether it is advisable to keep him on such work. In well-organized establishments some person is always in touch with the workers, and whenever the latter are unable to meet task times, he investigates immediately and is able to correct any existing bad conditions.

The tendency these days is to guarantee the workers an hourly earning. This is often done where piece work plans are in effect.

Two excellent outstanding features of a piece work plan are: first, the worker gets the benefits of his efforts—the quicker the time of performance, the greater the earning per hour; second, the simplicity figuring the earning of the worker.

The Gantt task and fixed bonus amounts to a single piece rate system when the work is performed in task time, for then the worker is paid at his hourly rate for task time plus the bonus or incentive as an extra compensation. This bonus is a percentage of the task time. However, if the worker takes longer than the task time, he receives only his regular rate for the time taken. This system, as with a piece work system, allows the worker the benefit of his efforts. Gantt's original task and bonus did not allow the worker the full benefit of his efforts. With this latter plan, when the work was performed in task time or better, the worker was paid for the time taken at his hourly rate plus a bonus which was a percentage of the task time, as an extra compensation. For example, if a task time was sixty minutes and the bonus was one third of this, or twenty minutes, and if the work was done in thirty minutes, the pay would be for thirty minutes at the hourly rate plus twenty minutes extra at the hourly rate. The Gantt revised plan, task and fixed bonus, pays sixty minutes time at the hourly rate plus the twenty minutes extra at the hourly rate for the task performance or anything better. This corresponds to what is done in a straight piece work system.

The Halsey premium plan, as originally conceived, fixed a time to complete a specific piece of work, and dividing the time saved, if the work was done in less than this time, between the company and the worker, on a prearranged basis. The premium time was arrived at from records of past performance. However, the Halsey plan is easily adapted to the refinements of time study, and in its application a task time is first determined from which a premium time is figured, so that when the work is performed in task time a predetermined amount is earned. If it is planned that this amount is to be a 33 1/3 per cent incentive, then 66 2/3 per cent of the task time is added to the task time, for the premium time. Then if the work is performed in task time, 66 2/3 per cent of the time is saved, half of which, or 33 1/3 per cent, is the incentive time allowed the worker; this in addition to the actual time taken. The earning then amounts to the sum of this time, times the worker's rate.

For example: if a task time to perform a piece of work has been determined by time study to be nine hours, then 66 2/3 per cent of this time, or six hours, is added to it, giving a premium time of fifteen hours. Then if the work is performed in the task time of nine hours, the worker's incentive is half of the time saved or three hours. His earnings then will be the time of performance (nine hours) plus the incentive (three hours) times his hourly rate, whatever that may be.

As the earnings are based on the time taken plus half of the time saved, the cost per piece is greater than on a piece work plan, based on the task time plus a 33 1/3 per cent incentive, for all performances between the premium time set and the task time. At task time it is the same as piece work, then as the time becomes less the cost per piece lessens. This is not the case with the piece work or Gantt plans; in these the cost and the earning per piece remain the same, regardless of how quickly the work is done, and therefore it offers a greater incentive to the worker and allows him the full benefit of his efforts.

The foregoing is only a brief description of what, I think, are the four best financial incentive wage-payment plans; namely, Taylor's differential piece work; a single rate or flat piece work, giving a task time or a production per hour; Gantt's task and fixed bonus, and Halsey's premium plan. This brief description is sufficient to call them to mind, for so much has already been written about them that it can be taken for granted that they are comparatively well understood.

During my career I have had practical experience with a great many different kinds of wage-payment plans, and have come to the conclusion that the four just referred to give as good a list from which to choose, as can be found. In this connection a situation may come up where special conditions have to be met, but then it is an easy matter to modify the plan chosen from this list to meet it.

Personally, I prefer a straight piece work plan to any other; it is more concise and conveys to the worker's mind a definite earning, and as the time of performance decreases the earning per hour increases in direct proportion, which is no more than justice to the worker. Also the matter of figuring the earning for the payroll is a simple calculation, and with the knowledge of the basis for the piece rate (the base rate), it can readily be determined whether the worker has performed in task time and, therefore, earned at least the amount expected; and by keeping up this standard one can be more assured of a contended employee. In addition it is a plan that is more generally understood by the large majority of workers.

Of the piece work plans described, the Taylor differential is the most exacting. The other piece work plan offers an excellent substitute and would probably have fewer objectors. Nevertheless, of all the plans that have been devised, the Taylor differential is the most scientific and efficient, for it brings out the best in both the worker and the management. The Gantt task and fixed bonus becomes a piece work plan when the task is equaled or bettered, but is not so simple to handle as piece work. If it is desirable to guarantee a day rate it can be done as easily with piece work as with the Gantt bonus plan. However, the Gantt plan is an exceedingly good one.

The Halsey premium plan is entirely different from any of the others. The mere fact that the premium time set is so much greater than the task or standard time of performance, offers an opportunity for some extra earnings, with considerable less effort, and in this way would serve in a measure as a training school for beginners under incentive methods. However, I do not feel that such a step is necessary with respect to the more efficient incentive plans, such as piece work, the Gantt bonus plan and the day wage plan. With the proper precautions and consideration for the workers taken into account, there need be no difficulty in introducing the more efficient plans from the start. Nevertheless, there is a place where no other plan serves a better purpose, and that is under conditions where it will require an indeterminate amount of time to establish an adequate production control, and it is considered advisable to start some kind of an incentive plan; but then it should be thoroughly understood that conditions are not standard, and that as units are standardized, correction will be made in every thing that has any bearing on it. So in course of time a change can be made to the more efficient wage-payment plans. There should be no objection to this change as far as the workers are concerned, if they thoroughly understand these other plans, for they would realize the great opportunity of a higher earning per hour in performances less than the task time.

Always in the introduction of any incentive plan, consideration must be given to an adequate production control. This implies in general a standardization of the equipment and of the methods of planning, scheduling, moving material, and issuing work to the workers, which is nothing more than assuring a plentiful supply of smooth flowing work throughout the department. It is equally important to acquaint everyone who will be in any way affected with the purposes and nature of the plan, and win cooperation. With a smooth flow of work for, and the time for the performance of work determined by time study, or by some means equally as accurate, and made known; with information concerning what the extra earnings would be if performed in standard time; and with assistance available during performance in the way of instructions and competent foremanship; then objections and hostility, if any, will practically disappear.

The merits and demerits of the many different wage-payment plans have appeared in print many times, and usually each writer has some particular existing plan that he defends against all others, or attempts to show the merits of a plan that he has invented himself. However, above all things what is wanted is a simple plan, involving a definite amount of work in a given amount of time and, when it is accomplished, a substantial reward. It should be one readily understood by the worker and simple in its computation as to what has been earned. And, in order to obtain *high wages, low labor costs, and lasting industrial harmony* under any plan, constant intelligent supervision is necessary, and consideration must be given such matters as assisting the worker who finds difficulty in performing within the time set, reconsidering times that have been set, which in actual operation seem to be inaccurate and unfair, and many other things that may come up during the course of a day's work. With these matters properly supervised, a high standard of production can be maintained.

Whatever the particular wage system, the employer must manifest good faith in the maintenance of rates. One of the great evils of the past has been arbitrary cutting of piece rates. The employer cannot guarantee the permanence of base rates, for these are subject to varying business conditions. But the time allowances for the performance of tasks should be determined by such precise time-study analysis and proven by such rigid production try-outs that these can be guaranteed. One concern printed the following guarantee on the workmen's rate cards:

> The Company guarantees that the Base Rate will not be changed as long as there is no Radical change in the Business and Industrial Conditions, and Guarantees that the Time Allowance will not be changed as long as the method described on the Instruction Card is in effect.

There are instances where incentive plans and a department for its control have been developed in plants to a high point of efficiency, and continued on this plane for a number of years. In such instances production has been increased many fold, labor costs materially reduced, and wages increased, with a consequence of harmonious industrial relationship. There has usually, however, been no opportunity for the detail comparison of new conditions with old conditions, for the reason that the older conditions did not furnish adequate and comparable records. It has been possible usually only to show that unit costs have been decreased.

Sometimes, after such a rate-fixing department has been developed, general conditions have brought about a change in organization—a change in management, or a frantic desire to reduce expenses, or some other influence. The experienced rate-fixing head may have been promoted without a competent understudy having being trained, or he may have been called elsewhere and the supervision left to some clerk. For a time the good results have continued, but eventually, without the most competent supervision, the rate-fixing department has deteriorated and conditions returned to what they were before the establishment of such a department.

THE psychological effect of extreme specialization is an interesting study also from the point of view of productivity itself. The Taylor System certainly errs in considering only the individual productivity of a given worker at a given moment. The productive capacity of industry in general depends indeed on other factors; notably the stability of the working force, which is obviously influenced by the amount of satisfaction which the workers derive from their work. This has been given serious attention by the Dennison Manufacturing Company of Framingham, Mass.: . . . . "The essential feature of our method of 'efficiency' is the importance which we attach to the psychological element. For instance, we consider it important that the worker see his finished product. Consequently, in many instances we avoid extreme division of labor, even when it appears at first glance that the productivity of an individual worker might on that account not be so high. We are disposed if necessary to accept the higher unit cost of a given operation, even to the extent of twenty-five or thirty per cent, if that enables us to avoid an excessive rapidity of operation. We believe it gives better returns in the long run, for it conserves the worker's interest in his work, ultimaely increases his professional skill, and above all inspires him to remain in our employ. The last factor enables us to avoid the very considerable expense which results from changes of personnel." . . . . .

Apropos of the cost of changes in working personnel, it has been computed that each time a commercial house or bank in New York replaces an employee, there is suffered on the average a positive loss of $100. This is obviously a genuine economic waste which has to be borne by the consumer.

(Translated from "Au Pays du Taylorisme," by Henri de Man, published by Le Peuple, 35 Rue des Sables, Brussels, Belgium.)

PERFORMANCE RATINGS AND BONUSES FOR SALARIED EMPLOYEES[1]

By Howard G. Benedict[2]

WITH all of us who have had the organization, direction and executive supervision of the work of others there has doubtless been a rather general desire for and a reaching out after something really tangible with which to measure the performance of salaried employees and to act as a stimulus to better effort and accomplishment by them.

1. *The Need for Ratings*

We have been careful when engaging new employees not only to analyze their apparent qualifications for the jobs, but to inquire of their previous employers as to their records, frequently sending out for this purpose blanks which list quite a number of general qualifications on which we wish the former employers to indicate their records. And yet how many concerns really make a well-defined attempt to determine the standings of their employees while they are still with them, and have any records at all showing what their ratings are, or, most important of all for the executive to know, the specific occasions for establishing such ratings? The inquiries we may make under such circumstances are usually answered at best only upon the basis of the general impressions that have been left behind, frequently colored with the haphazard yet freely expressed opinions of their fellows, who may or may not have had personal reasons for being glad to see such a man leave, or to unduly credit or discredit his work. Yet this attempt to check up our new men shows the trend in the direction of definitely rating the performance of such employees.

When we come to a consideration of salary adjustments, we have often felt the need of a "yard stick" to measure these salaried employees. When a man comes to you for an increase in salary, he is at least in *hope* of getting it. He may be in the class with those who ask for increases periodically regardless of merit, and who then turned down remark complacently, "Well, it didn't do any harm to ask, anyway;" or he may be one who definitely knows that he has earned as increase by his attention to the details of his work. It may be just as much an injury to the business to grant an increase to the former as to withhold an increase from the latter. Yet your general impressions of past performances of a subordinate (and these tempered by the time elapsed since their occurrence) is a pretty poor basis for passing upon the value of an employee to the business.

We must remember at all times that we are really building men. The product of our plant may be machines or garments or what not, but if we fail to bring out the best in those who contribute their efforts, we are failing morally in our duty to the "other fellow," and we are failing financially to produce our product at as low a price as we should. So in whatever way we can bring out and develop the best that is in our employees (and this not in any patronizing, welfare or uplift way, but as a matter of fair and just appraisal of efforts exerted and encouragement for still better effort), it is in every way just as much to our own advantage as it is to theirs.

For a good many years we have issued standard practice and standard routine written instructions for the carrying out of practically every detail that is called for in the factory and office, and we need just as much to *know* that this routine *is being followed* and to *reward* each individual for carrying out his or her work in more than an ordinary measure of interest, cooperation, skill and accuracy.

In reorganizing a plant, as soon as proper standards are established and tasks set, our hourly workers are usually put on bonus, premium or differential piece work, and we endeavor to have a standard of daily, hourly or unit output by which to measure the results of each man's work. We have also for many years set standards of detail performance, means of measurement and bonuses for rapidly and accurately executing tasks in many other directions than strict production, as witnessed by the standard routine and bonuses for gang bosses, instructors, inspectors, tool room attendants, tool messengers, move men, set-up men and machine helpers, sweepers, firemen, millwrights, and so on, as well as for washing windows, cleaning boilers, and in various divisions of sales efforts, and for typing, posting and numerous other clerical functions in the office.

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[1] A paper presented at a meeting of the Taylor Society, Cleveland, May 21, 1921.

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But it is in the work of our superintendents, department heads, functional foremen, clerks, understudies, and others, the results of whose efforts cannot be so easily measured, that we have felt the need of something by which we can really know whether they are continually executing anywhere near 100 per cent on their individual daily performances and really qualifying for further responsibilities. These are the men we are depending upon to carry out our policies and plans, and we need a means of accurately measuring the results of each one's work, and this measurement carried out so that it shows up the unsuspected "weak sisters" and the "Alibi Ikes," and also the newly developing really strong men of the organization, and so that they know it affects their own standing as to job and salary as well as the amount of the bonus coming to them as a result of their day's or week's or month's rating.

And in many plants, it is not merely in the detail duties and functions of their particular jobs that this need has been felt, for we have for many years paid bonuses to many of these men for the execution of their specific duties. It is rather more in matters of attitude and cooperation, reliability, ability, action, leadership and personal qualities, that we have felt the urgent need for a "yard stick" to measure up our men and women on the points that go to make up first-class business individuals in general. Along with this goes the rating of each one on his performance of duties of his particular job, but the qualities coming under the headings just enumerated carry a much larger measure of value in determining an employee's "net worth" to the business and to himself.

How many times have you gone through the plant and in checking up a foreman, gang boss, despatcher or move man, have called his attention to congestion or disorder, a high percentage of spoilage, lack of discipline, idle machines or men, excessive costs or a score of other recurring deficiencies, only to have him make a spasmodic and perhaps half-hearted, ineffective attempt at correction, and before your criticism was hardly cold, drift back into the old rut, or make excuses and "pass the buck" to someone else, knowing that real cooperation with his fellow foremen and workers had no definite money value which directly affected his own bank account that particular week or month?

Unless a rating is made and a bonus incentive offered for a high degree of daily performance, this outcome is apt to become a frequent or regular occurrence. It is to cure these conditions, and to cause them all to reflect a definite effect upon these employees' individual ratings, that this plan is utilized.

There is really nothing intrinsically new about this plan of rating salaried workers, except perhaps that it is carried a little further up the line than usual to include department heads and factory executives, and that we have made an attempt to analyze the elemental qualities that go to make up a first-class man in matters of cooperation, reliability, ability, action, leadership and personality, and that we provide for its functioning by the participation of the employees themselves in bringing to attention all matters which should be considered in determining all ratings, and really making these employees helpful in such participation in their industrial relations and the success of the business.

It is almost impossible to take up any phase of management and administration which has not been pretty well covered, in principle at least, by the work of Frederick W. Taylor. If it were not for the early work of Mr. Taylor in coordinating all shop activities and establishing standards of performance for practically everything that is called for in the operation of the plant, with bonuses for their correct and rapid accomplishment, and in stimulating others to extend his work still further, it is very doubtful whether we should be anywhere near where we are today in this particular development as well as in every other phase of management. Many a concern has inaugurated a beautiful plan of this, that or the other feature of management and control, and felt that it was their exclusive invention, only to find when they looked around that Taylor had many years before worked out that problem to a much more complete and practical conclusion, and perhaps long ago discarded some of the features since brought forward as new.

There has been a good deal of talk of job analysis, rating schemes, clerical tasks, and so on, as comparatively new things of the last few years, yet the job analyses and standing orders with bonuses for the routine duties of a large number of the salaried employees and day workers on other than production work, instituted by Mr. Hathaway under Taylor's direction at the Tabor Manufacturing Co. in 1905, sixteen years ago, were masterpieces and far excelled many that have been independently developed by others in recent years. These covered certain phases of attitude and cooperation, as the bonuses were revokable by the superintendent for such causes as inattention to business or improper behavior. In 1903 Taylor told me how essential he felt to be the issuing of such detailed specifications of duties and the providing of incentives for their proper performance. Mr. Hathaway and Mr. Barth confirm my impression that such procedure was at that time generally regarded as being one of the features of the Taylor System, that Taylor very early recognized the possibility of studying most all human effort in the plant and office, and many years before (I am confident between thirty and forty years ago) utilized standard duties with one kind or another of bonus or piece rates for many planning room, clerical and supervising positions that are usually salaried. Many of these tasks called for the given day's work to be done each day even if the party had to stay overtime to get it done. So when you get right down to it, there is really comparatively little that is new "under the sun."

The rating of cooperation, however, and the other qualifications that go to make up a general first-class man outside of the specific requirements of his job, has not previously had as much consideration or attempt at gauging as closely. However, in 1914, after a number of years of less complete measurement, I finally seriously undertook it in addition to the previously used rating of job performance, in order to forestall, meet and eliminate the obstruction, lack of cooperation, resistance to progress and change of method that so often here and there in an organization has been an issue that has to be met and eliminated, frequently through much sweating of blood and resort to strenuous measures.

Within an organization we shall always have differences of opinion—we want them, helpful, open-minded opinions, the results of individual thinking—but when, after considering and weighing these different opinions, certain policies and plans of action are decided upon, then the different divergent views should be subordinated to making the plan a success along the lines of the policy adopted by the business, even though it may be at considerable variance with an individual's previous stand.

It should be recognized at the outset, however, that for the intelligent acceptance and wholehearted carrying out of any new policy or plan (including this one), it is essential that it be thoroughly *sold* to those who are affected by it. In such selling of new plans as to their fairness, benefits and practical working, lies one of the most essential responsibilities of the executive heads of the business.

This plan of performance ratings as finally carried out is not the development of any pet theory, but the outgrowth of the actual steps necessitated in the enforced meeting of these situations and the search for a better and strictly practical means of stimulating cooperation where it had previously been sadly lacking, and of gradually meeting a long recognized need of knowing what quality and quantity of performance each member of the organization was actually contributing to the business.

2. *Rating by Elements*

In laying out the plan to be followed, we want, in the first place, a method whereby each salaried employee can be checked up, and can check himself up on the numerous points which constitute a first-class man in his capacity. Knowing what is expected of him and what his standing is each rating period, as well as the qualities and occurrences which go to make it up, he is enabled to profit by them and bring up the efficiency of his work and standing in future by overcoming his deficiencies.

We have endeavored to analyze what qualities go to make up a first-class man—a man who will stand 100 per cent on everything which makes for success as a business individual in general. This list of qualities is not considered conclusive by any means, but an effort has been made so to segregate the various qualities and their elements, that the performance on each one of these can be rated independently of the others. This list is added to from time to time as matters come up which need to enter the rating, and it is understood by all concerned that the rating is therefore not necessarily confined to the qualities covered by the list (which is furnished to each one), but that they are apt to be rated on additional ones as occasion may require, these being added to the list for future ratings.

The degree of value of any mode of measurement, I always feel, lies in the distance we get from general deductions. No one, no matter how clever, can *accurately* and *justly* pass on the value of a man in the general terms of cooperation, reliability, ability, action, leadership, personality, and job requirements, without first breaking down these qualities into their primal elements. Each of these is too big and too general a classification to admit of valuation except by the total of the ratings on the elements going to make up each of these qualities.

In order to be *able* to set proper standards for machine performance, it is necessary for us to break down the machine operation into its elements, analyze, and by slide rule or otherwise, determine maximum or relative values for each of the twelve variable elements entering into the machine operations. Each one of these elements affects the whole operation so much that the possibilities of the machine cannot be determined until the possibilities of each of these have been separately and relatively established. As Taylor has said:[1] "It will be evident that the mechanic, expert or mathematician does not live who, without the aid of a slide rule or its equivalent, can hold in his head these twelve variables and measure their joint effect upon the problem." How much less possible is it for a person to hold in his head and measure the joint effect of the more than a hundred variable elemental qualities of a first-class man!

In order to set an accurate task for a factory worker, the variable machine possibilities must not only be definitely determined, but in our time studies we break down an operation into its primal elements of motions and then evaluate these elements before we can accurately state the correct time for the whole operation.

Should we, therefore, try to establish a rating of an individual until we have first established ratings on the elements going to make up the qualities which we look for in this individual? If we do, we are reverting to rule-of-thumb measurement, which we have been trying to get away from these many years.

Therefore under Attitude and Cooperation we check up and rate on nineteen elemental qualities; under Reliability, five; under Ability we have fourteen elements; under Action we have twenty-one; under Leadership, fifteen; under Personality, seventeen. Each of these elemental qualities is given a value which will represent the percentage or points which will be deducted from 100 per cent for the total absence or zero marking on this element, with proportional ratings for the varying degrees in which such elements prevail. Then the requirements of each person's own duties, functions and responsibilities are analyzed, the elements are listed, and values similarly assigned to each. These job elements of course vary both in number and valuation with each individual.

In submitting the list of elements on which ratings have been based, I want to emphasize that I believe it is far from perfect and conclusive, and is submitted only incidentally to illustrate the point of rating by elements rather than to try to lay before you a complete, fixed or final standard of the particular units and the weighting of these units of measurements; and the groupings are primarily for convenience in listing the specific qualities rather than as necessarily accurate designations of the sum of items listed thereunder. Along with the discussion that may be brought out, it will be remembered that these elements are those that have been called for in meeting the attitudes and tendencies displayed in certain organizations. The original list of elements started with has been added to frequently as needs have come up; others which it was earlier thought were going to be quite important, have been eliminated. Those remaining have stood the test of frequent application and measurement, and though they will doubtless be altered in future, have been instrumental in bringing about a more healthy team-work, loyalty and individual effort in such organizations. In other plants, a somewhat different line-up of points of rating might be desirable, and I dare say, to a certain extent, *would* be desirable. In a similar manner, the method of arriving at the markings of each person is the result of the elimination of several earlier forms of establishing these standings, and may yet be changed if a more effective way is found.

The idea that I want to put across, and as strongly as possibly, however, is that we should adopt *some* means of measurement of salaried employees, that it should be based on the evaluation of *definite elemental* qualities, and determined not from general and vague impressions or opinions but from actual and *specific instances* of which memoranda is made at the time of occurrence, that its operating should be *open and above board,* and that to be successful as an incentive, it should be accompanied by *both moral and financial rewards* for high degree of performance.

The comparative weightings of the elements is a matter which I believe should be given extensive future study in various plants, and there is much to be gained by the joint study of these points by a group or committee of members of this Society working along such lines.

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[1] "On the Art of Cutting Metals," p. 32.

In outlining to the employees in an organization the qualities and activities upon which performance ratings will be marked, an attempt is made to make each one clear and easily understood by the persons affected. To this end, in many cases we show the negative and intermediate, as well as the positive qualities rated, so that the employees can steer clear of the negative and intermediate on such points.

The following illustrate the elements used for rating the qualifications of a first-class man in general, to which are appended the requirements of specific jobs:

A. ATTITUDE AND CO-OPERATION

	POSITIVE		NEGATIVE
A 1.	Readiness to cooperate		Antagonistic
A 2.	Ability to secure cooperation of others		Inability to secure cooperation or ability to only by playing favorites.
A 3.	Follows line of organization and authority		Disorganizer, oversteps his authority.
A 4.	Inclination to see and assist beyond own sphere, and to render service generally		Narrowness and selfishness.
A 5.	Willingness to adjust self to changes		Inflexibility.
A 6.	Readiness to shoulder responsibility for own acts		"Passing the buck."
A 7.	Helpfulness to others		Condemnatory toward others and trying to put them "in a hole."
A 8.	Gives due credit to others		Belittles, ridicules or 'hangs the crepe" on the efforts of others.
A 9.	Constructive attitude and helpful suggestions or criticisms		(Absence of Positive).
A10.	(Absence of Negative)		Disintegrating, demoralizing, destructive criticism, "crabbing," fault-finding, vindictiveness, "getting even."
A11.	Calls attention of proper parties to seeming wrong conditions or inconsistencies of practice		Follows orders blindly regardless of any seeming inconsistency or advisability of change; attitude of "not my funeral," "I should worry," etc.
A12.	Peaceableness	Participating in disputes	Trouble making and fostering disputes.
A13.	Agreeableness		Disagreeableness.
A14.	Open Mindedness		Prejudice and obstinacy.
A15.	Broad Mindedness		Pettiness.
A16.	Due humility		Haughty, domineering, over-officious.
A17.	Reasonableness		Unreasonableness.
A18.	Stability and courage of convictions		Vacillating, keeping to the "middle of the road" so can switch either way.
A19.	Reporting all violations of rules, discipline, errors. oversights, etc., which come or *should come* under observation.		

B. RELIABILITY

B 1.	Honesty		Dishonesty.
B 2.	Truthfulness		Untruthfulness.
B 3.	Dependability		Craftiness.
B 4.	Straightforwardness		Duplicity.
B 5.	Sincerity		Insincerity.

C. ABILITY

C 1.	Trade skill and competency.		
C 2.	Technical knowledge.		
C 3.	Ease and inclination to learn and increase ability.		
C 4.	Aptitude and handiness in new tasks.		
C 5.	Quickness to grasp and understand a point of view.		
C 6.	Mechanical sense.		
C 7.	Industrious	Happy-go-Lucky	Lazy
C 8.	Exceptional mental alertness	Indifference	Listless.
C 9.	Initiative		Inertness.

C10. Originality.
C11. Memory and recollection .... Forgetfulness.
C12. Judgment, good .... indifferent .... poor.
C13. Tactful .... Tactless.
C14. Expression of ideas.

D. ACTION

D 1. Aggressiveness, a "go-getter" .... An excuse maker.
D 2. Promptness in executing work and orders with energy, activity and alertness.............. ......Procrastination, requires repetition of orders.
D 3. Completeness and thoroughness of work assigned........................ Work only partly completed.
D 4. Attention to *Details* .... Superficial and perfunctory.
D 5. Systematic in going about tasks........................ Unsystematic
D 6. Concentration on work........................ Scatteration.
D 7. Persistence, tenacity, stick-to-it-iveness........................ Easily discouraged.
D 8. Carefulness .... Carelessness.
D 9. Efficiency and non-repetition of action.
D10. Accuracy.
D11. Rapidity.
D12. Regularity in attendance.
D13. Punctuality.
D14. Years of service.
D15. Supervision required.
D16. Foresight, thoughtfulness and planning........ ....Hindsight, heedlessness and no planning of work.
D17. Economy and care of business property, its freedom from dirt, rust, deterioration, etc............Extravagance and negligence of business property.
D18. Detecting and reporting wastes and leakages.
D19. Tidiness and orderliness of department........................Slovenliness and disorder.
D20. Suggestions for improvement.
D21. Correctness in filling out forms and records.

E. LEADERSHIP

E 1. Ability to instruct in detail.
E 2. Ability to issue clear and intelligent orders and make self understood.
E 3. Ability to harmonize conflicting conditions.
E 4. Supervising ability and inclination.
E 5. Orderliness and neatness of employees.
E 6. Coordination of forces at commond.
E 7. Discretion, prudence and reasoning.
E 8. Interrogation method of inquiry and criticism........................ Supercritical.
E 9. Impartiality .... Partiality.
E10. Logical .... Illogical.
E11. Decision .... Indecision
F12. Perception .... Density.
E13. Commendation .... Oppression.
E14. Patience .... Impatience.
E15. Acts only after deliberating........................ Impulsiveness.

F. PERSONALITY

F 1. Ambition .... Apathy.
F 2. Interest in work.
F 3. Observation.
F 4. Cheerfulness .... Grouchiness.
F 5. Earnestness .... Indifference.
F 6. Self-confidence and self-reliance........................ Dependence and leaning.
F 7. Self-control.
F 8. Calmness and poise .... Excitableness.
F 9. Mental depth .... Shallowness.
F10. Due contentment .... Discontented.
F11. Sympathetic .... Callous.
F12. Courtesy ....Rudeness.

F13. Optimistic .... Pessimistic.
F14. Personality, bearing and address.
F15. Neatness .... Slovenliness.
F16. Temperance .... Dissipation.
F17. Personal economy .... Personal extravagance.

J. SPECIFIC JOB REQUIREMENTS

INSTRUCTORS (functional foremen) IN PRODUCTION DEPARTMENT

J 1. Attentiveness of workers to tasks, freedom from loafing and unnecessary absence from work stations.
J 2. Promptness of workers in starting work mornings, noons and after recesses, and not stopping or washing up before bell at quitting time.
J 3. Promptness and accuracy of employees in following instructions.
J 4. Rapidity of workers.
J 5. Percentage of Premium or Bonus earned in department to total time on premium jobs.
J 6. Percentage of inspection rejections.
J 7. Percentage of Re-work and Salvage of faulty work.
J 8. Percentage of Scrap or entirely spoiled work.
J 9. Promptness in remedying trouble per inspectors' reports of rejections.
J10. Promptness and persistence in advising Despatcher of assignment of workers to jobs for which they are not fitted.
J11. Percentage of time lost waiting for tools or set-up.
J12. Promptness in setting up of jobs after Despatcher posts them on Planning Board as ready, and in actually starting the workers after Despatcher assigns jobs.
J13. Promptness in returning dull tools to tool room for replacement.
J14. Condition of tools permanently charged out.
J15. Promptness in reporting breakdowns or repairs needed.
J16. Promptness and thoroughness in getting replacements from storeroom for defective parts received at assemblies.
J17. Freedom from missing parts and parts left on floor, aisles, machines or benches.
J18. Proper handling and care of work at operations in orderly shape and with tags properly attached.
J19. Seeing that all workers properly display their Job Cards in clips at machines and that they correspond to the jobs they are actually working on.
J20. Employees' care and economy of company property.
J21. Low percentage of overhead material.
J22. Low percentage of overhead labor.
J23. Low percentage of workers' tardiness.
J24. Low percentage of absentees.
J25. Freedom from accidents.
J26. Freedom from fire risks.
J27. Maintenance and use of safety devices.
J28. Employees' suggestions for improvements.

Mechanism for Functioning

Nearly everyone has for years, of course, been used to the practice of issuing written inter-department communications, these frequently having printed headings, "Avoid Verbal Orders," "Verbal Orders Don't Go," etc. These inter-department memoranda are now made to cover all matters in the inter-relations of all activities of the business, and are not merely used for orders. It is essential for each person included in this plan invariably to make out one of these memoranda for every instance of neglect, errors, violations of rules, discipline, etc., which may come under his supervision or observation, in addition to use for all instructions and for suggestions of themselves or the workers.

These inter-department memoranda are issued in triplicating pads with carbon sheets attached, and of a size to conveniently fit the pocket. One copy is given to the party affected and one retained by the party issuing and signing, and one sent to the office of the Rating Committee, where they are filed under the name of the party addressed, pending review by the Rating Committee later for establishing the ratings.

While the issuing of these inter-department memoranda can be restricted to a few of the higher executives, I have found it much better to provide for their being issued by all the sub-executives who come under the rating, as well as by the Rating Committee and the higher executives, being used by each primarily in connection with the salaried functions, activities and individuals coming under their own supervision or responsibility. However, we want everyone, whether sub-executive or worker, to feel that, if he sees things going apparently wrong or wastefully even outside of his regular sphere, he has a privilege of calling the attention of the *proper party* to it so that it may be remedied. The time is long past when we feel that the worker should offer no suggestions. When the attitudes of our men are right (as they must be to be listened to) we are not afraid to have their observations expressed, and they should always have an avenue for this helpful expression.

In practice there is little tendency of trying to "get" the other fellow or of favoring a friend by overlooking some error, as any tendency toward these negative qualities is penalized very heavily, while freedom from them is rewarded. There is also developed a marked sense of fairness in the individual opinion of the "other fellow's" actions and intentions, which benefits the business as a whole. Yet each man feels that it is *his* business, and anything which is interfering with its conduct or profit, is going to be of enough importance for him to send through a memorandum on it. Everything is open and above board. No whispering informers are tolerated. If anything justifies tipping off the boss (as is frequently done in the absence of these rating memos) it warrants being first put straight to the man himself in black and white, with the confident expectation that when the matter has been called to his attention he will take care of it promptly and well, avoiding, so far as possible, similar situations in the future.

Each one sending a memorandum knows that the person receiving it will have a chance to explain the situation, and he is consequently fair in any possible criticism. The party receiving it might, under other circumstances, feel that he should have had the matter quietly called to his attention verbally without the written memorandum, which will be seen by the Rating Committee and possibly the "boss," but each one realizes in the first place (having been sold on the plan) the benefit to the business of each man standing on his own performance, and without the memoranda being sent through for this and all other similar matters, the basis for fair ratings throughout would be completely dissipated.

There are certain jobs, performed by either salaried or hourly rated men, where the bonus ratings are determined daily for the routine requirements of the jobs, independent of the general qualifications of the man (which are determined monthly). In these cases report blanks are sent out each day by the Timekeeper to the several functional or department heads who are in contact with or are served by the party rated. They are each required to indicate the day's performance of this individual for each of the duties enumerated and whether in their judgment the bonus should or should not be applied for that duty, specifying all failures to comply with the standard routine for that job, as well as the interdependent memo numbers on which they were reported. These daily bonus reports are then sent to one of the chief executives who, after inspection, indicates finally whether the bonus is to be paid or not.

The Rating Committee

All ratings (other than foregoing) are established by a Rating Committee. The makeup of the Rating Committee will vary with the type of organization and the progress it has made in employee participation. In a small concern where there is no acknowledged participation by employees, this Committee might be composed of three chief executives, the General Manager, Works or Production Manager, and perhaps Superintendent, the burden of the work possibly falling on the Works Manager. In a large concern where employees have become accustomed to participating in management problems under some plan of employee representation, a larger committee would be better, with say three chief executives, three chosen from among the sub-executives, one chosen from among the workers, and another as an alternate to act in place of anyone on the Committee when his own case comes up for consideration.

The Rating Committee meets periodically, in some cases weekly, but most cases monthly, and goes over the record of each person to be rated, carefully checks performance against the standards, and determines each individual's rating on each element and his total rating, which is his percentage of what a 100 per cent man should be on that job.

When each person's rating has been determined, he is then separately called in and informed of his rating and the specific efficiencies or deficiencies which have gone to make it up, so that knowing what they are, each can profit by them in the future. In addition, each one has his attention called to the low points and assistance given to bring out an improvement on these points.

With a view to making all ratings with full fairness and justice to all, each one is given to understand that if he feels that his rating on any subject is not what it should be, he is perfectly free to call the attention of the Rating Committee to it, stating his views on the matter. If he can convince the Committee that his performance on a given point has not been correctly appraised, a correction of the error will be made. However, a note is made of each such case, and a particularly high standing will be expected on such a quality in future periods.

Determining Ratings

When the rating memoranda are received each one is marked with the symbols of the rating elements which will be affected by it. If more than one element is covered, a cross index is made of the several elements, each referring to the serial number of the memorandum. These memoranda are then filed under the name of the individual addressed and in order of the symbols affected. Before filing, the memoranda should be looked over by the Superintendent or some other official to keep in touch with the current happenings, so that immediate investigations can be made where advisable.

When the Rating Committee meets, all of the memoranda on each element of a person's performance are gone over and carefully weighed. On the rating sheet, in the column for this individual and on the line for each element, is then entered the percentage of perfect performance under these elements. The rating sheets are then turned over to a clerk to calculate the deductions from 100 per cent which each of these element ratings constitutes. These deduction percentages are then entered in the column following the first ratings.

For instance, on an element which is valued at 20 points, the rating has been 75 per cent, or in other words, a loss of 25 per cent from perfect on that element. We therefore take 25 per cent of the 20 points, or 5 points lost on this element. When all deductions have been so calculated, the number of points to be deducted are totaled and are deducted from 100. To this is added the credit points of such items as cannot be deductions, such as years of service, and the total becomes that individual's rating for the month.

Rating Bulletins

When the ratings have been finally closed, they all are listed on a bulletin in the order of the standings, mimeographed, and a copy sent to each one rated so that he can see his relative standings. No one wants to have his name appear at the bottom for long, and we almost invariably see him boost himself into a higher rating the following month. The moral stimulus, in my observation, is much greater than the financial stimulus in a very large number of cases.

Bonuses

It is not absolutely necessary to have a bonus attached to the rating, as the comparative standings and their bearing upon advancement and salaries has a very salubrious effect. However, it is a very great advantage to have everything which those rated may do, have a direct money value, and to have their manner of handling their affairs reflect in the amount of their bonus each month. It aids in making all activities work more smoothly and harmoniously, and is more effective in increasing the efficiency of those rated.

The establishing of the amounts in bonus which the ratings will represent is largely a matter of policy with each concern, to be determined by the management, taking into consideration local conditions, the grade of help, and so on. The ratio of 100 per cent bonus to the individual salaries should also vary somewhat with the different functions and responsibilities, as also with the range of salaries paid for such functions. Care should be taken, however, to see that the amount of the bonus is sufficiently large to really act as an incentive for the efforts which we expect to be exerted.

In some cases the bonus for a 100 per cent rating for instructors, gang bosses, inspectors, storekeepers, receiving and shipping clerks, truck drivers, etc., may be sufficient at 20 per cent of their monthly salary, but in other cases around 33-1/3 per cent may be more equitable and productive of results, which I have usually found it. The rate for those with less responsibility, such as assistants, move men, mill-wrights, etc., might be 10 to 15 per cent less, but as stated before, should be dependent upon the extent of the duties of each and the responsibility involved in such duties. On the other hand, with lower salaried employees, such as tool room attendants, tool messengers, balance of stores clerks, etc., whose duties nevertheless require such accuracy and involve possibility of frequent errors if carelessness creeps in,—in these cases, a bonus as high as 50 per cent of the regular salary is not out of place, and the amount of money involved as bonus is not more than sufficient to really be an incentive for unusual care and alertness.

The bonus I believe is best paid to the workers by depositing monthly in a savings account, from which it will be turned over with interest to the employee at the end of the year.

Prime Requisites

In applying such a plan of performance ratings as this, there are several considerations which I believe to be of the utmost importance for its successful and smooth working.

First: Before attempting to do anything whatever is the way of rating, there must be established standards of detail duties, responsibilities and accountability for everyone in the organization, with copies of this standard practice in the hands of or available to all affected. We must also have an organization chart on which is portrayed in graphic form not only the relations and accountability of the different individuals and departments, but also the functions and duties which they are called upon to perform.

Second: In the matter of issuing the memoranda which form the principal basis for the ratings, it must be operated jointly by the employees and the management, so that everything that transpires can be appraised, not merely the occurrences that a chief executive may see.

Third: Employees must be made to feel that they are not "butting in" or tale bearing when they call attention to a neglect or error which may come to their attention and which affects the business even indirectly. In fact, they should be made to feel that their rating will be higher if they do call the attention of the *proper party* to such matters, and in a helpful and cooperative way, free from any super-critical or condemnatory slant. However, they must also realize that if these negative qualities do enter into it, their ratings will be lower than if the matter were not broached.

Fourth: It should be realized by all that cooperation by every one in the organization with all of the others and with the policy and plans to be followed is absolutely necessary to the conduct of a profitable business, that therefore in the ratings, the various subdivisions of cooperation will be given considerably more weight than other items, and that any uncooperative, disagreeable or vindictive attitude in bringing up a matter will be penalized heavily.

Fifth: The plan must be "sold" to the employees who come under its operation, and they must be given to understand clearly that it is now a permanent feature of the business, not something to be given a "fair trial," in which case it is pretty sure to fail.

Sixth: The management of the business must assume much more responsibility than under the traditional type of management, in the establishing and *maintaining* of standards of sub-executives and workers, and in demanding *continuous* alertness in the *strict* rating of all performance free from the laxity which might otherwise gradually creep in. The management is also called upon for more efficient performance on its own part, carried out on the "exception principle," and embracing the policy of *serving the worker.*

These requisites are listed, not in the order of their importance, but in the order of their usual sequence of planning the actual activities incident to the putting of them into effect. From the standpoint of the importance and the sequence of educational effort preceding the inauguration of the plan, I believe it should be started in the reverse order.

Serving the Employee

Eighteen years ago, in seeking the advise of Mr. Taylor and in discussing with him the application of the principles outlined in his then recently presented A. S. M. E. paper on "Shop Management" and in his previous "Piece Work System," to the operation of the plant of which I was then manager, I recall very vividly his insistence and emphasis (as he could emphasize so well) on "serving the worker." He so often urged then and later that one of the first fundamental duties of the management is to *serve the worker,* and this *serve the worker* he so drilled into me as well as others who came in personal contact with him, that we do not easily forget it. The principle of serving the worker calls for checking the performance of the sub-executives in their actually serving the workers thoroughly and promptly. We must also to a high degree of performance serve our sub-executives in the matter of policy, decision and action, much more than has often been the practice in the past.

Of what use is it to expect a large output if indecision or changeable policy on the part of the management has held up ordering material or tools which have to be received before parts can be made, which are required for assembly of the complete product? As a consequence, the workers "stall" around and try to appear busy, when they realize that some one higher up did not look ahead far enough or thoroughly enough or soon enough or follow up closely enough to provide them with the means for carrying out their job. The worker is quick to recognize this lack of preparation, and even after the delayed items are received, the worker often fails to see why he should worry or "break his neck" when those higher up have not done so to all appearances. Or of what avail is it to call a worker to account (as he should be) if he takes much longer than he should to do a job, or fail to earn his bonus or premium, only to find that his tools were not gotten ready for him in advance, and that he had to wait a quarter or half an hour after he had been "rung in" on a job for the foreman or himself to hunt up, grind or adjust the tools required; or if a new operator has to stumble through a new job as best she can without the thorough and detailed instruction she should have from her foreman? The management must set the example for the sub-executives, and they in turn for the workers, by insistence on thorough preparation, planning and carrying out their end and furnishing the means for the workers to carry out theirs.

In the final analysis, the main goal sought by this method of stimulating, rating and rewarding performance, is not to *make* men do things, but to make them *want* to do them. In training salesmen in the selling of goods, we have for a good many years emphasized "don't make your man buy, make him *want* to buy," and this applies just as forcibly in getting results in the shop and office as it does in selling. In one of the recent Taylor Society meetings, in discussing the special inducements and rewards at the Joseph & Feiss plant for getting workers to learn other than their usual operations, it was jokingly remarked that they "bribed" them to do what they wanted them to do and what was best for the workers. The same conditions often exist in trying to get sub-executives to do what you want them to. It is making it sufficiently *interesting* to them to make them *want* to do it, for the higher standing and the additional money there is in it for them, if for nothing more. So both the moral and financial stimulus of this rating and bonus method results in the sub-executives *wanting* to co-operate, follow instructions, and execute fully. *It pays.*

As a further analogy in the sales field: we impress on our salesmen to continually stress the point with their prospects that the article offered will "make them money," and "save them money." So our sub-executives are led to feel through the performance ratings and bonus that their cooperation and "delivery of the goods" pay them in money as well as in their standing with their fellows and with the company and in getting the better things out of life. *It pays everybody concerned.*

COST ACCOUNTING—A REVIEW

Cost Accounting to Aid Production. By G. Charter Harrison, New York, The Engineering Magazine Co., 1921, pp. xv, 234.

The author of this publication, though himself a professional accountant, strongly indicts his profession for its decided shortcomings in the manner in which its members as a class have in the past missed their opportunities to render full service to their respective employers. He also calls attention to the principles of scientific management as being just as applicable to cost accounting as to shop production. But though recognizing Taylor as the founder of scientific management, the author appears to be unaware that Taylor developed a highly scientific, completely interlocking cost and accounting system[1] even years before he can be considered as having become conscious of his development of a system of scientific shop management. The author states that Mr. Harrington Emerson was the first apostle of scientific management to call attention to the inadequacy of the unscientific methods employed by, and the purely retrospective results obtained by cost accountants in general; and that the late Mr. Gantt[2] did the same thing somewhat later. The author thereby creates the false impression—which it is partly the object of this review to correct—that Mr. Taylor never gave any serious attention to cost accounting. This impression is conveyed in the following passage:

"The engineering profession, however, has very clearly perceived many of the defects and absurdities of the established methods of cost accounting, and in no case have these been better demonstrated than by Mr. Harrington Emerson in his work entitled "Efficiency as a Basis for Operation and Wages." In the numerous volumes on scientific management and cost accounting which have appeared since that book was published it is surprising to find so little information along constructive lines as to the methods to be followed in order to put into practical operation the ideas advanced by Mr. Emerson."

But as Mr. Taylor at least thirty years ago found that the accountants with whom he was brought in contact, could furnish him with only a lot of stuff that was of no value to him, he finally, though reluctantly, made up his mind to study the subject of cost accounting for himself, with the result, which was inevitable for a man of his make-up, that he eventually revolutionized completely both what he had learned in the course of accounting he passed through and the practice of the industrial cost accountants he had been associated with. Yes, so much so, that for some time (in the middle nineties) the introduction of his cost accounting methods constituted the principal part of his professional activities.

However, realizing that the increase of shop efficiency would benefit his clients vastly more than improved cost accounting, he soon concentrated on the former, without however deprecating the, at that time, only secondary value of the latter. In view of these facts, it would appear that to Taylor, and not to

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[1] It is all the more interesting to note that the author of the foreword to this book, Mr. L. P. Alford, mentions Taylor's name first among those who emphasized the importance of costs in connection with the general scheme of management.

[2] Mr. Gantt was one of Taylor's earliest pupils and co-workers and acquired his knowledge of the basic principles and practice of scientific management in that service. However, he did not remain with Taylor long enough to get at the time the full significance of Taylor principles and practice, and in later years offered as original and improvements on Taylor methods, methods that were embodied in what he had acquired from Mr. Taylor in years gone by.

(Continued on page 168)

HOSPITAL ADMINISTRATION[1]

By Frank E. Chapman[2]

WHEN I received an invitation from this Society to discuss with you the question of hospital operation, it seemed to me a little bit presumptuous that I should discuss a subject of scientific management with a group of individuals such as constitutes the Taylor Society. In looking over the faces of my audience, however, I feel that there are more guests than Taylorites here, and it seems to me that I am but transferring my activities just a little bit further East, that the majority of the group before me are the same faces that I have been in the habit of talking to for a good many years.

To me, one of the enlightening things of a meeting of this kind, and frankly the thing that decided me in accepting this invitation more than anything else, is the fact that somebody from the outside is taking a little interest, and looking on the inside of hospital organization. To me it seems to indicate an awakening in interest concerning hospitals that cannot but help produce good results. One of the mistakes that we have made in the past is the fact that we have surrounded our activities with a shroud of mystery. We have taken the attitude that we have certain functions to perform, that we should perform them as we see fit, with no consideration for the opinion of the laiety of the community, which after all is the group that we are attempting to serve. I do not believe that this position is a tenable one. I believe, whether we will admit it or not, that immediately upon a hospital's opening its doors it becomes a public utility, dedicated to a degree of public service far more fundamental than any other public utility of which I know. By very reason of this fact, the public whom we are serving is entitled to a knowledge of the things we are giving them. In submitting this statement, I should like it clearly understood that I do not differentiate between the hospital for the care of the indigent or the hospital for the care of the provident.

In a discussion of the theories and principles of hospital operation, it is believed that we should first visualize what a hospital is. If I read my history correctly, the first hospitals were for the insane, and the development of hospitals in those early centuries was practically at a standstill with respect to function. With the introduction of the principles of antisepsis and asepsis, and with a better understanding of the theory of anesthesia, we see a gradual development of the surgical hospital. After a period of time, with the progress of the science of medicine, and the realization of the need for that intensive correlation of various medical specialties in order to get the proper diagnosis, there developed the need for a hospital offering facilities other than surgical. I believe, and I believe it sincerely, that a hospital to function properly must be the health center of the community it serves. It must furnish every known means for the scientific diagnosis and care of patients. Just in so far as it does furnish each of these needs is it going to succeed.

It is my further belief that with the development of hospitals with this principle uppermost in their scheme of operation, we are going to see a more intensive and extensive hospitalization of the sick than ever before. There are many conditions which lead one to make this prediction: the demands of the clinician which cannot be met in the matter; our present-day shortage of both medical men and nurses; our present-day method of living—these are among the most important factors that will produce this greater hospitalization. If this prediction is sound in the main, is it not up to you and to me to see to it that our hospitals fulfill the obligations assumed when they took unto themselves the names of hospitals?

We have heard innumerable comments that hospitals are inefficient, and I believe those of us who have been privileged to know the hospital field generally rather than locally will admit that there is not the degree of efficiency in hospitals that there is in industry. There are a lot of reasons producing this condition, and I shall not attempt in the time allotted me to outline those reasons. I am, however, going to attempt to outline what to me is fundamental and, if followed in the main, will, I believe, produce a more efficient performance than can be produced under the haphazard methods of the average hospital.

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[1] A paper presented at a meeting of the Philadelphia Section of the Taylor Society, January 23, 1922.

[2] Director Mount Sinai Hospital, Cleveland; Executive Secretary Ohio Hospital Association; Committee Chairman American Hospital Association; formerly Superintendent St. Louis City Hospital; formerly in charge of business management St. Louis and San Francisco Railroad.

It has been my privilege in the past six years to have seen a very large percentage of the larger hospitals as an official visitor, having been sent into the hospitals for a specific purpose; therefore, I have seen these institutions in a much more intimate way than the casual visitor would see them, and I feel that I am qualified in a slight measure to say something of the inside workings of our hospitals. I should like to preface my remarks by assuring you that there is nothing personal in any comment that I have to make; that my sole object is to attempt to stimulate closer understanding of the complex problem of hospital operation and to induce our administrative bodies to apply the same fundamental principles in the operation of their philanthropy that they have applied in the producing of their personal successes. I shall therefore attempt to outline an organization from the Board of Trustees down, not going as much into detail as I should like by reason of the lack of time, but giving you a skeleton or framework of the organization.

Board of Trustees

Members of boards of trustees are in the main selected because of their individual successful performances. They are pre-eminent in their respective places, but the sad commentary is that when they are put on the administrative bodies of philanthropies, they forget the principles that made them successful in their individual walks of life. It must be realized and realized all the time that the fundamental principles of operating a steel mill are identical with the fundamentals of operating a hospital. Therefore the same scheme of organization or schemes of organization that have produced efficiency in industry are applicable to hospitals.

It must be borne in mind that the board of trustees of any organization is the policy-forming body interested in the big perspective of the whole problem, in the formation of policies, both administrative and financial, and in the selection of some one delegated with the power to carry out the principles outlined by them. There is a very pernicious practice in a large majority of our hospitals of committees of the board acting in other than an advisory capacity. The trouble with most of our boards of trustees is that they are trying to run everything, instead of having a superintendent capable of administering the affairs of the institution—you might just as well be a twenty-five cent rubber stamp. The superintendent in a very large number of instances has no control whatever over the organization he or she serves, and then you wonder why you don't get efficiency. I can show you organizations in which the superintendent no more presumes to give instructions to his various department heads without consultation with the board of trustees, than he would think of flying, for the very reason that he knows that if he did, and the department head disagreed with the instructions, they would go to some member of the board, and the next day the order would be rescinded. I should like to ask you how long such a policy would last in industry?

If the average hospital of today were compelled to stand exclusively on its own resources, we should not have nearly so many hospitals as we do. Please do not misunderstand. I do not expect that the hospital rendering community service can be self-supporting, but I do believe that the funds given by a community to serve the indigent and quasi-indigent of that community are sacred trusts, and that it is obligatory for the administrative bodies of our hospitals to apply those methods that will produce the most efficient operation. If this statement is correct, what is the necessity of experimentation? Industry has very definitely shown us what methods will produce results. Why not think of our hospitals in terms of industry, and take from industry those fundamentals that have made industry successful, and apply them with slight modification of detail in the operation of our hospitals?

Size of Board

So far as the size of the board is concerned, I think this is immaterial, but first of all let's get an active board. Let's get a board that is composed of men from every possible walk of life, so that we may bring into the deliberations of the board a composite knowledge of as many divergent points of view as possible. Let's get an individual who can bring the social point of view, the financial point of view, the merchandising point of view, *ad infinitum*, so that the policy-forming body will bring into its deliberations a broad view of all of the complex problems of the activities of the community.

I believe that the operation of a hospital is one of the most complex procedures in our life today. In addition to all of the physical problems that one has, do not forget that we are dealing all of the time with abnormal

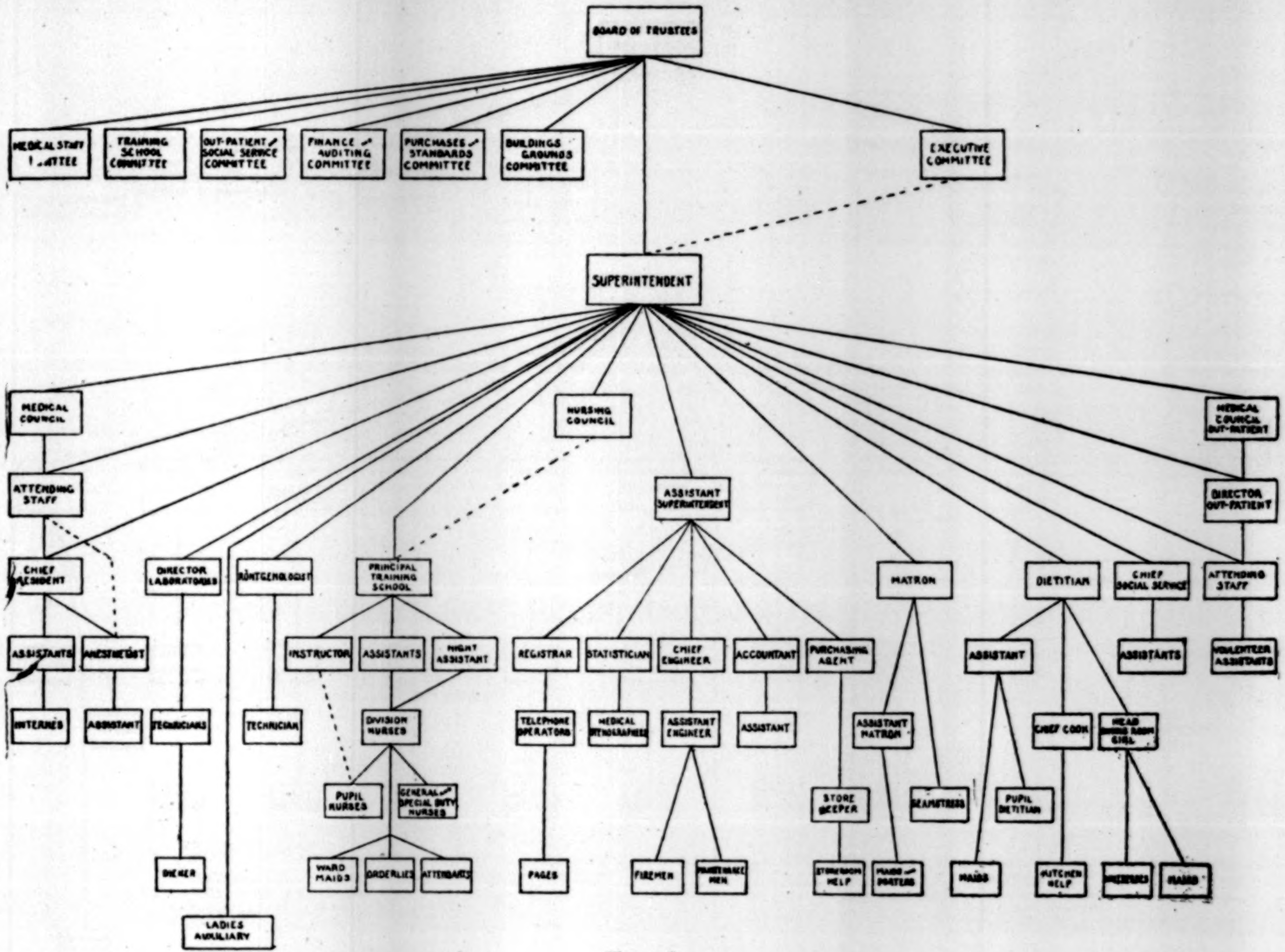

Chart I

humanity. With such a complex procedure, the administrative officer is going to need every bit of advice and every bit of help that the board of trustees, properly functioning, can give him. It is the primary job of the board, as I see it, to afford the administrative officer that inspiration that is so necessary to success.

I believe that an ideal board is of approximately eighteen members. In my opinion there should be very definite standing committees, approximately five in number. I have had distributed this evening the chart of organization of the institution that I represent (Chart I). This chart is illustrative of a board of eighteen members, with an Executive Committee, a Medical Staff Committee, a Buildings and Grounds Committee, a Purchase and Standards Committee, a Finance and Audit Committee, an Out Patient and Social Service Committee, and a Training School Committee. These committees are made up, with the exception of the Executive Committee, of the Chairman and two members. An attendance of two is expected at all committee meetings, and these committees meet regularly in the performance of their work.

The Executive Committee is comprised of the chairmen of these standing committees with the President of the Board of Trustees as Chairman. The Secretary and Treasurer of the board are also *ex officio* members of this committee.

No committee of the board of trustees may give instructions to the administrative officer. The Executive Committee has authority to give instructions in an emergency, but such instructions must be confirmed by the board of trustees at their next meeting. All their instructions, except, of course, in emergencies, must come through regular channels to the Board of Trustees, and by them be transmitted to the administrative officer. May I give you one of the reasons for this?

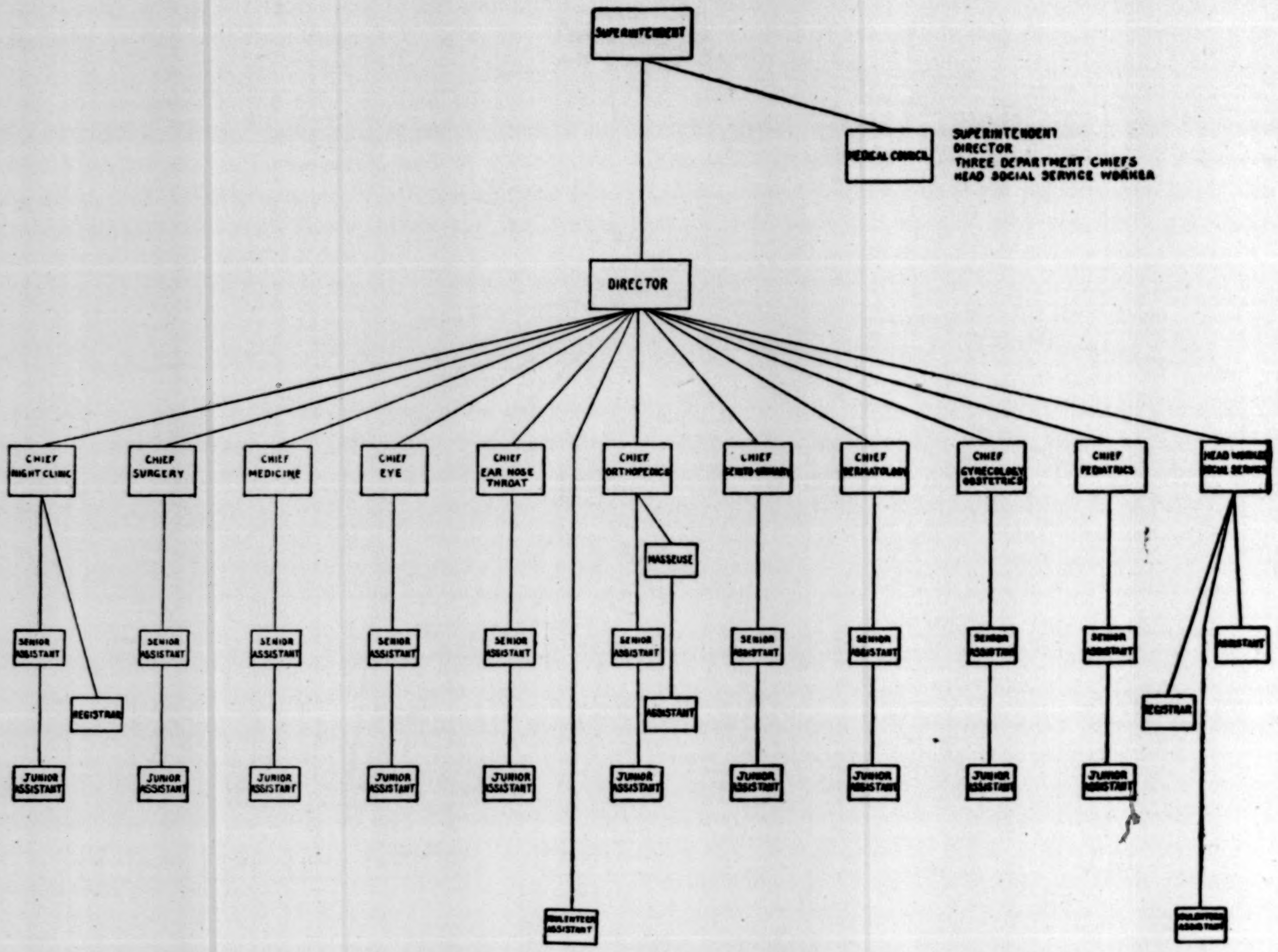

Chart II

We all know, and I suppose we have all had experience with some exceptionally strong, aggressive personality on the Board of Trustees who by very reason of this aggressiveness is able to put over anything which he wants in a selected group. Let us assume that that individual is made Chairman of the Nursing Committee. Can you not visualize the nursing activities of the organization being developed far in excess of the ability of the rest of the hospital to follow? This is one of the things that will happen if you permit the line of instructions to be direct. If on the other hand you secure the approval of the board to recommendations of the Nursing Committee, you will find the latter toned down so that the development of the institution as a whole will be more uniform.

Ladies Auxiliaries

There have been a great many things said about ladies auxiliaries, and again I should not like to be misunderstood. I think that any board of trustees of a hospital should have the influence of women on it, for I believe that woman brings to the board a point of view than man never can bring. I do not say this in a spirit of flattery; I mean it. But I do say that the organization of a ladies auxiliary as now set up in most of our hospitals is one of the most trying problems that a hospital administrator has to contend with. When you set up a subservient group of people, you violate the principles of organization. If you give them policy-forming authority, you are creating a sub-government. If you give them administrative authority you are creating a potentiality for trouble that will become ever-present; and if you give them no authority, they have nothing to do. If your principles of organization are sound, and your board of trustees is functioning, there is no logic in their existence as they are constituted today. On the other hand, there is no debating the

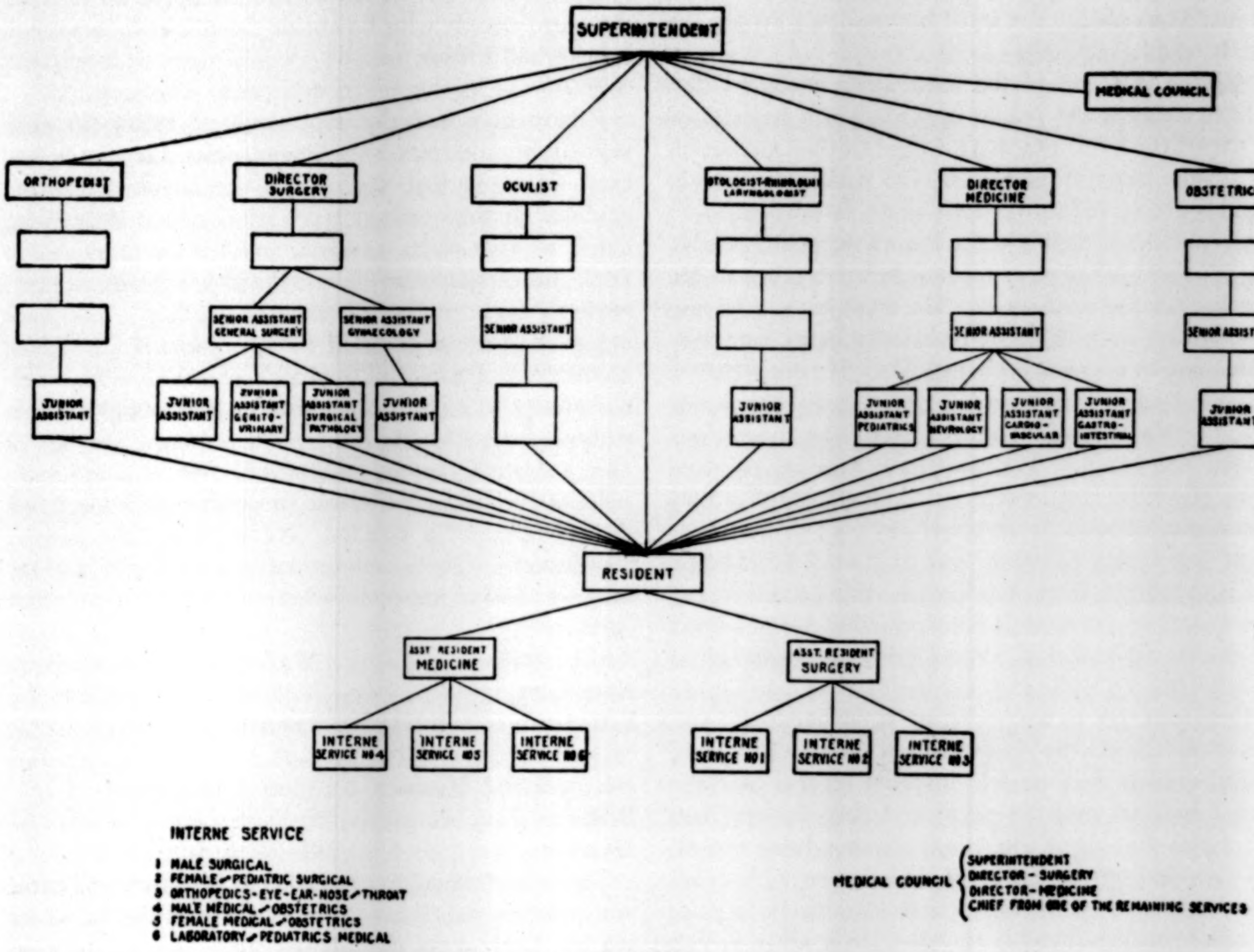

Chart III

statement that a group of women organized into an auxiliary is the greatest potentiality for spreading the gospel of the hospital they serve, that I know of. I do not mean by this that they talk more than men do, but I do mean that those little intimate things about which the public are interested will be disseminated around the community by those having a sympathetic interest, and after all one of our prime jobs is to sell our hospital to the community it is serving.

Superintendent

So much for the organization of a board of trustees. In a discussion of organization, I am going to violate the discussion in the abstract in but one instance, and that is in the discussion of the Superintendent. If there is accepted the fundamental principle of centralized control, then the keynote to the whole structure is the administrative officer. We have often heard it said that no hospital is stronger than the staff that serves it, and I think that it is true; but I will carry this still further and say that no staff, no matter how strong its members, can function without the right kind of an administrative officer. To my mind the Superintendent should be responsible to the Board of Trustees for the entire activity of the institution. He should be the medium of expression of the Board of Trustees to the various personnel, and in turn he should be the medium of expression of the personnel to the board. I am assuming, of course, that at all times he will be honest, and when I say honest I mean fair in his dissemination of information from every source. His primary responsibility is the correlation of all of the problems of administration; to see to it that there is an articulation of the activities of the various departments—and please remember that, with the complexity of this organization, it takes some one with a very thorough understanding of a great many of our social problems to properly administer the affairs of a hospital. I want it understood that I mean this just as much for the small hospital as I do for the large hospital.

I believe that one of the most acute problems that we have today is the proper operation of a hospital of less than fifty beds, and don't forget in this connection that a very large proportion of the patients served in hospitals are served in this type of an institution.

I should like to define just a few of the qualifications, as I see them, of a proper administrative officer. He must have a financial sense. He must have a buying sense, with a knowledge of practically every commodity that enters into our economic life. He must have a mechanical sense. He must have a professional point of view; be able to recognize the problems of the various professional groups. He must have a social point of view. He must have a technical knowledge of a very great many intricate procedures; not necessarily an intimate knowledge of them, but a general knowledge. And last but not least, I believe he must have a very large supply of the milk of human kindness, for I don't believe that a hospital can be properly administered on any other than a very personal basis.

When you get a composite of these qualities, you have an individual that in any other walk of life could demand a great deal more in material returns than the average hospital position pays; and may I right here offer a plea that all of you board members read the report compiled by the editor of The Modern Hospital, and study the range of hospital salaries that are paid, and after you have read it stop and think about it just a little bit.

You ask me what is the matter with hospitals, and my unqualified answer to you is that you cannot get efficiency for the salaries that the average hospital pays its superintendent, and until such time as our boards of trustees realize the importance of efficiency in the administrative position of their hospitals, and accept the principle that we should get the maximum of efficiency out of one of the fundamental functions of our everyday life, just so long will it take us to get efficient hospitals.

There seems to be some argument going about the country now as to the relative value of lay and medical superintendents. I am not particularly interested. Frankly, I am not especially afraid of my job, although I am just one of those lay superintendents. You know, the thing to me is not whether the man has a medical training or not. *The important thing is whether he has an administrative training, and is capable of running a hospital.* If he has a medical degree, there is all the more reason why he should be efficient, because I believe, and I think most of you will agree with me, that education of any type is conducive to efficiency.

I have also had the reputation of trying to oust women from hospital superintendencies, but that is not true. I believe that women superintendents are better qualified to take certain types of hospitals than men; but I do want them qualified, and I want to get away from the appointment of inefficient superintendents, medical, nurse or lay, all over the country. The placing of the responsibility of the operation of a hospital, no matter how small, in the hands of an individual with no conception of either the problems or obligations, is nothing short of criminal.

Outline of Departments

I should like to show you an outline, as I see it, of the operation of a hospital divided, first, into various departments. These departments are not listed in order of their relative importance but are listed for purposes of control:

Administrative	Medical Staff Attending
Housekeeping	Medical Staff Resident
Laundry	Laboratories
Mechanical	X-Ray
Purchase and Issuance	Special Therapies
Dietary	Social Service
Nursing	Out Patient.

These departments are roughly grouped into physical and professional, but do not forget that the activities are so closely inter-related that there is practically no line of demarcation. Please do not forget further that the contact of the administrative officer with each and every one of these departments is administrative only, and that the minute he presumes either to dictate or control the activities of the professional group, he assumes unto himself a prerogative that is unsound in the fundamental principles of organization which we are attempting to set up. His job is to secure an absolute correlation and cohesion of activities.

I want to emphasize first of all the most important thing that I believe there is in the operation of a hospital, and that is departmental control. I do not believe that any hospital, no matter how small, can operate efficiently unless the department head can be made to realize her absolute responsibility for the personnel under her.

Budget System

The financial policy of most of our institutions is really a joke. To use the slang expression, "it just ain't." Money is a necessary evil. We must have it, and in order to make it work for us to the best possible advantage, it must be conserved; and therefore there is recommended for your very earnest consideration that every hospital, no matter how small, apply the budget system of financial operation, and stick to it through thick and thin. I am not particularly interested in how my dietitian gets results. I am only interested that she lives within her budget. I am assuming that by virtue of her training she is more qualified to say whether she shall serve squab or she shall serve corned beef and cabbage. My contact with her along these lines is simply this: "Miss Dietitian, you have so much money to run you for such and such a period of time. My judgment of the performance of your department will be predicated upon the saving that you may make in this allowance, and the character of service that your department performs. Don't come to me and ask me details. I am not interested in whether you have another cook or three more cooks. I am only interested in knowing that your budget is adhered to." This, of course, is predicated upon the thought that that budget will be figured correctly, and that it will allow of an adequate personnel to man and an adequate supply of commodities to furnish service such as the institution wants furnished.

With the operation of such a system—taking your department heads into your confidence, showing them what you have to work with, and showing them each month what they have done—it will be an inspiration to see how they will work with you. One of the most inspiring things in the game is to see a group of department heads or a group of head nurses discuss ups and downs of their budget.

Industry has accepted this principle and found it has worked. Why can't we accept it as a fundamental and take advantage of it? We are merely taking advantage of a very strong human characteristic, the spirit of competition in striving for a goal.

In the institution I serve, we have a system of keeping a record of the breakage of each nursing unit, and notifying the head nurse at the end of each month of the breakage in each division of the institution. The storeroom tells me that there is not a month that some head nurse does not come down to see why her breakage was as high as it was by analyzing her breakage list; and I ask you, is this not worth while? The trouble, as I see it, is that the average administrator has surrounded his activities with a lot of mystery. He has been afraid to give away his trade secrets to his department heads. After all they are not secrets. These people are working with you to produce a good result. They are intelligent and they are human, and certainly they will work better with the stimulation that an open discussion will bring, than they will if they are merely doing things on instructions.

Administrative

It is not going to be possible to outline in detail, but I am going to run through the various general groups. The administration is divided into the following groups:

Superintendent's Office	Admitting and Registrar
Accounting General	Telephone and Information
Accounting Patients	Records and Analysis.

These are rough groupings of the first general departmental group. I have brought with me various forms outlining the procedures, used in the institution I represent, that I should be very glad to show and explain to any one that may be interested. I realize that I am in the City of Brotherly Love, but at the same time I have always believed in preparedness, and I have brought these with me to back up the statements that I am making. (Charts II and III.)

The Superintendent's office must be the pulse of the institution. In it one should be able to tell what is going on all over the place, and one cannot do this by sitting at one's desk. I believe one should get around the institution, and get a feel of it, but I don't believe that one should go around so much as to lose a perspective of the whole. I believe that one of the greatest mistakes that most of our administrative officers make is that they tie themselves down with so much detail that they have no chance to see the big things. If you are tied down with detail you cannot get that great big perspective of community service, which after all is the real job of a superintendent of a hospital. I do not want you to think that I am attempting to build up an elaborate organization, but the trouble is that most of our administrative officers are performing duties that could much better be performed by a much lower priced member of the personnel.

I visited not long ago a superintendent of a hospital of 375 beds, and spent approximately forty-five minutes with him, and I think I am conservative in saying that 50 per cent of that time he spent in telling me how he tested his butter—that man tested the butter himself twice a week. Will you tell me what he had a dietitian for, and do you believe that a man holding the position that he is holding is best serving the institution by testing butter? That is not an exceptional instance; it is typical of a large number of our hospitals. Not very long ago I heard the cashier of a hospital of over 500 beds ask the authority of the superintendent to make an adjustment of twenty-five cents a day on the hospital bill.

There can be produced a system of morning reports that at a glance will reflect the condition of the entire institution. That morning report can be prepared in from five to fifteen minutes, and it should only be necessary for one to look at this report to find out what one wants to know. It is just as much the right of the administrative officer to have this on his desk every morning as it is for the head nurse to have a report of the conditions of the patients in the house on her desk.

If your hospital is large enough to warrant an assistant or assistants, please don't make the mistake of letting them run wild; allocate definite duties to them, and let them alone. Load your responsibilities on to them, and make them responsible for results. Turn them loose, and let their success be a test of your ability to administer. There is in the exhibits that I have brought with me a statement of house orders that we have devised. I have found through experience that if one sets up an elaborate set of rules of administration, thirty days after they are set up a large percentage of them are dead letters. Make your rules and regulations active. Make your system so flexible that obsolete rules can be discarded without affecting the live ones.

Accounting in General

I am not going to attempt to outline the details of an accounting system, but merely to state the various pertinent requirements; first, a set of books that will permit of a complete recording in such detail as is indicated, of every financial transaction of the institution; second, a chart of accounts that will permit of a proper allocation of all charges and payments to proper expense accounts; third, a proper budget system as previously outlined; fourth, a daily report to the superintendent; fifth, machinery for a monthly report to the Board; sixth, a control of daily earnings and collections.

The primary object of an accounting system is to record all financial and commodity transactions of an organization, and to furnish a basis for study of past performance in order that present performance may be judged and future planned for. I do not want to set up an elaborate accounting system, but I do want that system in sufficient detail to permit of ready accessibility of such statements of performance as may be necessary to make a comprehensive study of that performance. It does not seem that we can intelligently operate our institutions unless we know something about what we have done in previous periods; and, after all, any system of accounts that does not permit of a definite segregation of income and expense in definitely prescribed divisions is incorrect in principle. To you Taylorites this may sound like A, B, C —and it is A, B, C—but as a matter of fact there are not one hundred hospitals in the United States that have these fundamentals. This is a sad state of affairs, but it is unquestionably the true.

Accounts Relating to Patients

The patients accounting system should be predicated upon the following: First, a system of special charges for special procedures; second, a ward census which answers a dual purpose of originating charge to patients and furnishing the information for vital purposes; third, report of admissions and discharges; fifth, the preparation of bills and the collection of accounts. Such a system should permit of the daily control of patients' accounts. There is submitted for consideration in this connection the using of any standard billing machine. Our patients' accounts are in control every noon for the previous day's performance. In this way our balance at the end of the month is struck automatically with the last day's work.

Admitting and Registration

The admitting service consists of the following requisites: the patients' register; the clothes list; the valuables list; the mechanism for sending information immediately to the proper source of information; and facilities for the reservation of rooms. The details of such a service, of course, must be worked out in the individual hospitals, and I have not the time to outline any of it here.

Telephone and Information

There is one service in the institution that I should like to dwell on at a little length, and that is telephone and information service. To my mind the telephone is the nerve center of the institution, and it must be so efficient as to furnish quick and efficient means of communicating not only from the outside world with the hospital, but as between departments in the hospital. I can recall an advertisement that was put out by the Bell Telephone Company, headed "The Voice with the Smile," and after all is it not exceedingly important that we pay a little bit more attention to the manner in which our telephone is answered? You call up the average hospital and say, "How is John Smith today?" "He's all right," and bang the telephone is hung up. That is about all there is to it. He is so and so, or she died last night, and bang goes the telephone. Such a procedure is rather a commonplace thing to the telephone operator, but how about the fellow on the other end of the line? I believe that this is one thing that has been neglected more than probably any other one single item, and I believe it creates more ill feeling towards hospitals than anything else.

We have adopted a policy in the institution I serve, on our main telephone trick, of employing no one who has not had instruction in voice control by the telephone company. The telephone, as I see it, is the gateway of the hospital, and it makes a very large difference in the opinion of the outside world if you have the right kind of a voice on the telephone. That voice is one of the salesmen of the hospital to the community.

It may be desirable at times to combine the telephone and information center. In my opinion, it is logical. Others disagree with me. I believe that, inasmuch as the telephone switchboard is the recipient either directly or indirectly of all information of the hospital, that it is logical to set up the information center at that point. In any event, wherever you set up such a center, make it all-inclusive. May I describe to you the information service that we have adopted? I don't say it is perfect; I am merely giving it as a suggestion. We have a cabinet that has about twelve drawers for a visible index, in which are arranged the following: an alphabetical record of patients by location; a census showing the board of patients on each ward; a reservation for obstetrical rooms. All calls for information are referred to "Information." All the patients in the institution are flagged with colored tabs on one, two, three and four condition. With respect to all patients that are in condition one or two, the information is given out without contact with the ward. With respect to three—on the danger list, no immediate cause for anxiety—or four—immediately serious—information is instructed that under no conditions is any information to be given out except after contact with the ward. In addition thereto, we placed in our main lobby an information desk, or rather a hostess desk, to take care of personal visitors to the institution; and I submit to you that this installation was one of the finest things from the question of policy that we have ever done. The interesting thing about this installation is that for the first two months after it was inaugurated the individual was hardly kept busy, but after that we were constantly having to rearrange her work by reason of the increased number of activities that developed at her desk.

Records and Analysis

These records are divided into three groups: professional, financial and vital. The professional group is the patient's history and all of the various procedures that enter into it. I am not going to attempt to go into this at all. I merely want to say this: you cannot expect a busy practitioner of medicine to make a complete record of his patient's performance, unless you provide him with a mechanism that will make this recording easy. While it is true that you must hold the practitioner responsible for this history, after all it is an administrative co-responsibility, and the administration must so look upon it.

With respect to financial records; the trouble with most of our administrators is that they look upon the recording of financial performance of their hospital in a sort of humdrum way, with no especial interest in it. A great many of them are not qualified to analyze finances, and as a consequence get very little out of such an analysis. To make a study of figures is as much or more romantic than reading a book of fiction. If these figures are studied intelligently, they will reflect a store of human interest that very few studies will reflect. It is necessary that there be available quickly for any given period a statement of that period's performance. The analysis of accounts which are months late is of no value.

The next group is that of vital statistics, and should include an analysis of all of the various activities of departments. A great many of you get reports from your various department heads, but what do you do with them when you get them? They are generally filed away, and my knowledge of the average file tells me that they cannot be found. Such reports do not serve in any sense of the word their full value. What I want done is to develop a system of automatically recording these reports so that reports of a comparable period and of a comparable service will be thrown together for periods of comparison. If your nursing cost jumps twelve cents in one month, find out why. If you have a large number of complaints on one ward, why is it? If you will go around with question marks eternally on your lips, which question marks emanate from the reports that you have intelligently studied, you will be surprised how quickly a large part of the troubles that you may have will be ironed out. There are a large number of details of these reports that I could go into, but I have not the time. If your view of your job is founded, as I think it should be, on the betterment of service to the patient, then any change that can be made to increase the patient's welfare is well worth while; and I don't believe that the things that I am suggesting, after the mechanism is once set up, will require much more effort on the part of those who administer hospitals than are some of the methods now in use.

Housekeeping Department

In the Housekeeping Department, get the Matron to develop schedules of work. Have your work for a given nursing unit, for the maid that is on it, outlined and written out. See to it that she is checked on this schedule. Work up a schedule of cleaning windows, of waxing floors, of polishing brass, and see to it that the Housekeeping Department reports the performance on a basis of the routine check of these schedules.

Laundry

In the laundry, the problem is divided into that of washing, finishing, mending and distribution. Don't operate a laundry on a hit and miss basis. Get a statement of the clothes weighed or of pieces washed, whichever method you like better. Get a routine report of the amount of linen taken out of service; of the amount of linen torn. Study it. Find out why. Find out how long a sheet lasts, and why it does not last longer. Get efficiency experts from the various laundry supply houses to check up your formulae, and see if you are getting the maxmium of good out of the commodities you buy. You will be surprised at the savings that you can make.

Mechanical Department

Probably one of the largest items of expense in hospital operation is heat, light and power, and maintenance and repair expense; yet I venture the statement that it is one of the most sadly neglected departments in the hospital. Why?—simply because the average administrator does not know anything about his mechanical department, and because the administrative board has not seen the wisdom of employing supplemental efficient mechanical supervision. Keep a check of the number of tons of coal you use, of the amount of water you use, of the mean average temperature of a given month, compare it with last month, and see how you come out. Find out how many tons of ice you pull, and what it is, in terms of percentage, and see that you are buying the kind of coal that you ought to have. Keep a record of the repairs on your wards, how they compare as between ward and ward, and what the nature of these reports are.

Purchase and Issuance

There are three problems in this general head: purchase, storage and internal requisition.

Requisitions for purchases are two-fold—one from the storeroom, and the other from department heads for special equipment. Machinery should be set up that insures that absolutely no purchases of any type should be made without the definite approval of the administrative officer, and without the knowledge that these purchases will not exceed the budget for the account to which it is to be charged for the period. No purchases, no matter how small, should be made on any other than a competitive basis, and bids should be obtained. There is a definite difference between buying and placing orders. Indiscriminate purchase of supplies by hospitals is, in my opinion, one of the biggets items of waste, and further, gives stimulation to very unsound merchandising as between hospitals and vendors of hospital commodities. There are very few one-price hospital supply houses today, and that is simply because the average superintendent of a hospital does not know how to buy. It reminds me very much of the story of the fellow who said to the nigger boy, "Sam, what size hat do you wear?" Sam's reply was, "What size have you got?" A lot of these fellows look an individual over, and if the latter looks easy, their prices are so and so, with the mental reservation that they can shave it from 10 to 50 per cent and still make money.

All orders given should be confirmed in writing, this confirmation to be specific in details of commodity, price, terms and delivery. I think it is desirable that this confirmation be made in triplicate—one copy to the vendor, one copy to be used to follow up the purchase, and another copy for the storeroom.

All receipts of commodities should be on a written form, in order to complete the transaction, and to make the bill ready for payment. Every voucher that is passed for payment should contain the following: a copy of the purchase order, with the approved request for purchase; a receipt slip indicating receipt of goods; a bill from the vendor properly O. K.'d as to receipt, price and extension; and all of these should be filed with the voucher.

The next problem is the problem of storage and recording. In my opinion all hospital supplies should be carried on an inventory card or sheet. This inventory should show the date received, the firm name from whom purchased; the commodity, the price, the amount of the commodity, the amount of money represented, and to whom distributed. The stores inventory should be carried on a chart of accounts similar to the financial accounts. The expense item of a given period should be predicated upon the monthly inventory adjustment, this inventory to be taken on the adding machine from the inventory sheets, except on bi-yearly periods when the physical inventory should be taken. In other words, the inventory figure for a given account, as of the first of any month, plus the receivings for that month, minus the inventory for the last date of that month, should equal the expense for that account for that month. In addition to the stores inventory there should, I think, be an equipment inventory of the institution.

The internal requisition system is one of the bugboos that I believe most of our administrators fear, and in my opinion too much stress cannot be put on this system. Efficient buying may save you 10 to 15 per cent, but efficient issuance of your supplies can save an untold per cent. I should like established, first of all, the fundamental principle that the consumer at no time should control. In other words, a dietitian should never have control of anything else but her daily need of foodstuffs. All requisitions should be approved by the Superintendent or a properly delegated assistant superintendent and at no time by the department head. There should be established a definitely set supply day, not exceeding once a week, with the possible exception of the main kitchen, which may have daily supplies. There should be a definite system of breakage exchange, and broken commodities replaced only on exchange basis. In other words, a broken thermometer may only be replaced by bringing the broken parts to the storeroom. This broken thermometer may have no value, but the moral effect is what will produce the results.

Laundry should be issued on requisition only, as should also repairs for such work as is necessary. I should like to set up a system of reporting breakage to the end that the various units may know what their breakage amounts to in a month. It is very enlightening to see this, and the efficiency of various working units can be very definitely judged in some measure by such lists.

In closing a discussion of this very important department—a department that is very often sadly neglected—I should like to make this further point. Hold the sanctity of your storeroom inviolate. Don't permit anybody, whatever his or her position, to get a single thing out of the storeroom without a requisition, and that requisition properly approved by the constituted authority. If you once permit your personnel to violate this very definite order, you might as well discard your whole stores system.

Dietary

The problems of the Dietary Department are twofold: the feeding of patients and the feeding of personnel. There is a variation in control in various hospitals, but in any event the department should be considered a primary department, and report made by the head of the department direct to the administrative officer, and not through any other channels. The old-time practice of having a dietetian under the principal of the school of nurses is fundamentally incorrect. The submittal of routine menus for given periods cannot help but produce not only economy but efficiency.

Nursing

The problems of the Nursing Department are twofold; that of nursing patients and that of training student nurses. Today one of the biggest problems of hospital administration is the result of lack of understanding between nurses and the administration of hospitals, and it will take a mighty level-headed piece of thinking to avoid bringing about a chaotic condition. The attitude on the part of some of our nurses that "the hospital is a bridge upon which the superintendent of the hospital and the principal of the school of nurses may meet to discuss problems of nursing education" (and I am quoting literally the words of one of the members of the nursing profession) is so very far distant from the ideals and ideas that I have of hospital service, that I think it is bound to cause a lot of trouble.

If our system of nursing education is wrong, we should change it; but so long as we have this system of nursing education, let us not forget that we are taking care of patients primarily. No one wants higher education of nurses any more than I do. No one wants to see the nurses advance more than I do. But when it comes to a question of training nurses or the care of the patients, let us take care of the patients.

Medical Staff Attending

There is very little that I should like to say in connection with this, with the exception of the establishment of medico-administrative policies. Most of us have seen the pernicious effect of one man controlling a hospital, and it is just such a condition that I should like to fight. To set up a system for the formulation of the proper administrative control, we have established a Medical Council, consisting of the Director of the Hospital, the Director of Surgery, the Director of Medicine and the Director of one of the Specialties, and to them are referred all matters dealing with the medical policies. No medico-administrative policies are issued by anyone of the constituent members of the Medical Council, but they are transmitted by the director of the hospital, as orders from the Medical Council.

There is, of course—and very important indeed—the development of monthly meetings of the various services. This cannot help but be productive of great good.

X-Ray Laboratory and Special Therapies

In the next division I am going to include X-ray laboratories and special therapies. These facilities are a definite part of the hospital service, developed as an aid to the clinical staff in the diagnosis and treatment of disease, and can in no sense of the word be considered as primary services. They are merely supplementary to the clinical staff. It is my sincere hope that the day will soon come when they will be included in the cost of room service, just the same as the nursing and dietary cost.

Social Service

The development of medical and hospital social service is probably the newest development in the hospital field. Very few of our institutions have in any sense realized the potentiality for good of such a service. There are untold advantages and avenues of service. I am not going to attempt to give them in any kind of detail. I am just going to mention the two which any organization can start with: first, the follow-up of interesting cases, and next the affording of material relief and the assuaging of the anguished minds of some patients in the hospital in regard to the condition of those upon whom they are dependent. We have found a very great field for this latter type of work in our own institution.

Out Patient Department

If the hospital is to be the health center of the community it serves, and if by this example it is to assist in the formulation of better medical practice, then the biggest avenue of service that it has is the operation of an efficient Out Patient Department. By the very nature of the work that it does, an Out Patient Department reaches many times the number of people that the hospital proper reaches, and reaches them in a way that can be of great therapeutic value.

I realize that I have talked longer than I probably should. I should like to crystallize the comparison of a hospital and an industrial establishment as follows: both of them have a board of trustees, the policy-forming financial group; both of them have a general manager—one may be called president, the other superintendent; both of them have department heads, in one group they may be called production manager, sales manager, *ad infinitum,* in the other they are called Principal of the School of Nurses, Dietetian, *ad infinitum;* both of them should have, if they have not, laboratories for research and checking; both of them, if they are to be efficient, must have regular channels of disseminating information and instructions, to the end that the top may know what the bottom does, and that the bottom may understand the problems of the top. In this way only can we get that efficiency that is so desirable. You may say that I am building for you a mountain of red tape. I answer you by saying that when it becomes red tape, it becomes inefficient. But so long as it is virile, so long as it produces results, the procedures that have been outlined will produce the more efficient plant.

QUESTIONS

Following his paper Mr. Chapman answered questions, addressed to him from the floor, as follows:

Q. Do you keep any running record or inventory of supplies?

A. We have a perpetual inventory that will tell at the close of any night's business where anything went. For a 250 bed hospital, that is kept by half the time of one individual.

Q. Do you have any idea how many items you have?

A. Over seven thousand.

Q. Do you feel that it is quite possible to have a perpetual inventory of your supplies?

A. It is very easy. There are several essential things: You have to get your personnel to believe in you, to believe the things you are trying to do are the right things; you have to forget the old time issuance of supplies and accept the principle that the consumer at no time shall control; you must issue requisitions for everything you issue. Then you have control of the supplies, will be able to keep an inventory and you will save on supplies. There should be no indiscriminate issuance from stores.

Q. Are the terms medical director and superintendent interchangeable? Is there a medical director and a superintendent in the same institution?

A. I don't believe I can answer. I should hope not. A medical director holds a position similar to the superintendent. There are some places where there are business managers and resident physicians and a lot of scraps; but there are just a very few of those places.

Q. How do you hold individuals responsible for the goods that are issued to them properly on requisition?

A. We divide commodities into three different type—equipment, usable supplies and consumable supplies. On the equipment and consumable supplies there are inventories taken every thirty days. On usable supplies there are definite standards set up for certain commodities and they are replaced by requisition. We do once in a while make people pay for something.

Q. How about instruments and equipments?

A. Those are consumable supplies and they are definitely charged to the unit. There is a psychology in making somebody pay for something every once in a while.

Q. Do you have them pay for something that is lost?

A. Every once in a while we have an epidemic of loss and then we will start charging for loss and breakage. I wish I had time to give you some interesting figures on that. I disagree in principle with charging for breakage, but the amount became so large at one time that we had to do something, and so we decided we would charge for breakage. As a result the breakage in a given period dropped 74 per cent as compared with the previous period; but the next month we took off the charge and it went up 80 per cent. Those are absolute facts in terms if dollars and cents over a period of three months. The third month the breakage was worse than the first, so we did not gain anything by charging.

Q. Can you tell us how you charge meats?

A. I can only tell you the system. We charge directly. Meats are checked through stores and go directly to the dietetian's cooler. She has a supply cooler and a working cooler. The meat is received by the storeroom but is handled directly through the cooler.

Q. What is charged as received?

A. The amount received is charged into the supply account directly; but with bacon, or things of that kind of which we carry a stock, any inventory of that at the end of the period is carried over. Fresh meats we currently consume and do not carry over.

Q. Is one person responsible for that meat after it is left in the storeroom?

A. The dietitian alone carries a key to her stores.

Q. Suppose you buy a whole beef, how would you charge it?

A. I would carry it in the 473, or the supplies account, and if that were bought on the last day of the month, such part of that beef as was not used would be carried in the inventory and deducted from the expenses of that month. The inventory as of the first of the month, plus the receipts for that month, minus the inventory as of the end of the month, is the expense of the period.

Q. Have you any suggestion to make in charging to those different departments?

A. The only suggestion I have is this: What I believe is workable is the form of accounts outlined in the report of the Committee on Forms, which I have shown. I think it is as simple as you can get. If you get it any more simple you lose the value of segregation.

DISCUSSION

Robert J. Patterson:[1] While the prime object of a hospital is the relief and cure of disease, the training of nurses and the study of disease, incidental to these is the acquiring and spending of funds, the custody of and accounting for property, and records of the efficiency of the use of resources. Therefore there is much in common between a hospital and a business enterprise.

A hospital has no right to go out into the community and request financial assistance if it cannot give a statement, based on adequate records, of the use to which it has put its resources, of the condition of its properties, and of the cost of its operations in terms of classified activities.

It is no wonder that hospitals have been lax in business methods. They have been administered generally by individuals trained for other activities than, perhaps temperamentally not fitted for, the conduct of business affairs.

A hospital is a trustee of resources devoted to a public service. Its business affairs should be administered with as great technical competence as any business enterprise. That requires business ability and experience in the executive responsible for funds, property, purchasing, and the records of the application of these.

Dr. Joseph C. Doane:[2] I should like to follow out this line of thought: What is the thing which is costing us $2.00 or $3.00 or $5.00 a day? A per capita cost of $1.00 or $2.00 or $10.00 means nothing, unless there is some inquiry into the manner in which the money has been spent.

There are so many different varieties of hospitals and services, and so many different degrees of efficiency, that the mere fact that one hospital spends $2.00 a day, and another $1.75, means nothing. I am inclined to believe that there is a stage at which a hospital can arrive, where it should be ashamed to tell how low its figure is, just as there is as stage where it should be ashamed to tell how high it is. I do not think that a cost of $1.00 a day is a thing to brag about, because there may be a deficiency in service.

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[1] Bureau of Municipal Research, Philadelphia.

[2] Medical Director and Superintendent, Bureau of Hospitals, Philadelphia.

The hospital must have a by-product in the education of nurses and physicians, and it is impossible to accurately charge the cost of this service, and determine whether or not the business is profitable. The degree of care which is given to patient, the quickness with which he is restored to usefulness, the amount of really valuable scientific work which comes from the laboratories, the degree of instruction which is given to interns, and the efficiency of the trained nurses, *all of these* must be considered in figuring whether or not one may consider the money of a hospital well spent.

It is impossible to tell, by merely looking at an annual report, whether the hospital is well run, whether the money has been well spent or not, unless there is some idea of the amount of preventive medicine, the kind of teaching, and the care which the patient gets.

None of us will dispute the question that there is only one important person about the hospital. Sometimes, I think, in our desire to have beautiful architecture and well-run plants, we forget that the patient is really the excuse for the hospital's existence, and that our whole endeavor must reflect back to the patient's bed, or all the effort is in vain.

I should like to second Mr. Chapman's statement relative to the folly of turning over the management of valuable hospital property to a person who is neither well trained nor well paid. The statement that the hospital is the most poorly run business in the world is too frequently true. There must come a time soon when boards of trustees will be educated to the fact that a successful hospital administrator is a real specialist, and that a person who might run a shoe store or a stocking factory can not walk into a hospital and make a success of it. I know that Mr. Chapman, in referring to some individuals as being abnormal, was thinking, for example, of the surgeon, who had talked at length on a case as being one of acute appendicitis, and then at the operation discovered it was something else. This is not the kind of a man to talk business to, or of whom at the moment to expect any calm consideration of a hospital problem. The administrator must have the hospital atmosphere, and know when to leave departmental people alone, and when to approach them for real, good judgment.

The administrator of the hospital must have concise ideas as to what work he expects from his various departments. Take, for example, the medico-social service worker; if the superintendent expects her to return dollar for dollar for the sum expended, by collecting money or any other material thing, I think he is mistaken in her function. She is a medical person, one of the personnel that should try to get people well, and you cannot estimate how much value the treatment is to this, that, or the other patient. It may cost $50.00 to cure red-headed Johnny Jones of pneumonia, and whether Johnny develops into a senator, a vagrant or a hold-up man, is a development of the future.

So outside of the fact that we should be careful of our purchases, and should endeavor to run our hospital organizations on an economic and efficient basis, we must remember that we have yet to reach the stage where enough money is spent on intensively trying to get people well.

HENRY WOOD SHELTON:[1] Suppose we here present constitute ourselves the newly elected board of managers of the "Hospital of the City of Brotherly Love." We have been elected for the purpose of strengthening and revivifying an old institution which has drifted into something of a rut.

Our first step is to define just what our institution should try to accomplish, and then to measure in some way the success of its efforts. We define our aim as a three-fold service to the community: (1) a quantitative service—to treat as many patients as possible; (2) a qualitative service—to cure the largest possible percentage of those we treat; and (3) an economy service—to render maximum quantitative and qualitative service at minimum cost.

As intelligent managers we appreciate the need for units of measurement by which progress in the rendering of these services may be known and compared. As what I wish to say has to do with the third kind of service—economy—only, let us assume our board adopts the cost of all we do for one patient in one day as a unit of measurement; that is, the cost per "patient day." Upon inquiry we are told that cost records on this basis are already being regularly kept, and that they reveal unusual managerial ability.

In support of this claim, for example, we are given the comparative monthly cost figures[2] for 1920 and 1921, and it is pointed out that in March, 1920, the free-ward cost per patient day was $4.33, while in March, 1921 it was only $3.85. This saving of 48 cents or 11 per cent, is naturally a source of pride to our superintendent. It looks fine to us, too, until one of our number, an investigative board member sometimes described as "meddlesome," discovers that in 1920, $1,000 of the "cost" for March was spent for some new equipment. When that $1,000 has been charged properly to capital outlay, instead of wrongly to current expense, the unit cost per patient day in 1920 becomes only $3.90, and the saving in 1921 only 5 cents, or about 1 per cent. This discovery seems to have some bearing on our "size-up" of the record of "unusual managerial ability!"

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[1] Management Engineer, Philadelphia.

[2] The figures, but not the dates, in this illustration are taken from an actual case.

From another angle, we find that that $1,000 item affects the comparative monthly cost of the particular department in which the new equipment was installed, by 200 per cent. After the correction, the difference in the monthly departmental expense in the two years is less than 1 per cent.

Our board becomes concerned about the validity of the figures it is getting. It cannot abandon them altogether, without being helplessly at sea in any attempted measurement and analysis of progress. So it does the usual thing,—appoints a committee (including the "meddler") to review present methods of getting costs and other vital facts, and to recommend desirable changes.

Our commitee finds some other interesting conditions. For instance, our hospital has several active and devoted "auxiliary" societies, as well as individuals, from whom are received many gifts during the year. These are accepted and absorbed without being valued or accounted for other than by thanks to the donors. One month our costs are low, because we have had some nice gifts which we can utilize; another month we have to buy those things, and our costs go up. We may have *used* the same amount of these articles each month, but our costs have changed. That seems rather upsetting.

Yet suppose we adopt the suggestion of one member, and value all the gifts of food, clothing, flowers, soaps, and so on, received each month, and enter them as part of the cost for that month. One of our well-wishers, a large soap manufacturer, sends us a supply of laundry soap enough to last six months. If we put the value of six months' supply into the cost of one month, it overweights the cost of that month, and underweights the cost of the succeeding five months.

In that connection our committee finds another interesting thing. According to our purchasing and accounting methods, goods may be ordered in January, received in February, paid for in March, and used in April, May and June. Or again, our earnest and really efficient superintendent, acting as purchasing agent, finds he can make a real saving by buying at a bargain for cash in March a supply of goods which will last a year. If he does it, what happens to our unit patient-day costs in March? And what is the corresponding effect on preceding months? A superintendent may even be tempted to sacrifice the real money saving to the hospital rather than expose himself to criticism for an inordinately high monthly cost figure.

So the committee shows the board that if one charges to monthly cost either the value of gifts received, or the money paid out for supplies, the effect on the validity of the figures is the same. It reports the way out as the establishment of both physical and financial stores control through a separate Stores Department. It points out the necessary distinction between "stores," which are supplies and other things to be used up in the operations of the institution, and "new equipment," which increases the permanent value of the plant. All stores items received, whether by gift or purchase, pass into the Stores Department, and are charged to a general ledger stores account at their estimated value if they are gifts, and at their cost, including transportation, if they are purchased. Stores items are withdrawn from the Stores Department for use only on written requisition, so that they may be credited to stores and charged to the departmental or other expense account for which used.

The committee report finally states that such stores control not only is essential to secure usable and dependable cost figures, based on actual consumption, but also gives the superintendent his only possible chance to make an indisputable record of progress in managerial efficiency by—

1. A reduced and wisely balanced investment in stores items.
2. A new certainty of having on hand what is needed, when it is needed, in the quantity needed.
3. A reduced variety of items carried, and so reduced cost of handling those items.
4. Reduced losses from waste, depreciation and obsolescence.
5. Increased economy in purchasing by more accurately anticipated needs.

The savings made possible by stores control have been estimated by one hospital superintendent at 15 to 30 per cent of the total expense for supplies. The possibility of such a saving should not be ignored.